Cross-national consumer segmentation of retail formats and consumption trends for Britain and Taiwan

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Declaration

I hereby declare that this thesis has been composed by me, and that the work is my own, and that the work has not been submitted for any other degree or professional qualification.

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Acknowledgement

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Abstract

This study uses four national survey datasets across Britain and Taiwan to conduct cross-national consumer segmentation on four retail formats (Internet, hypermarket/superstore, supermarket, and traditional market) and two consumption trends (convenience and health trends). A diagnosis of equivalence, which precedes the segmentation process, suggests that the retail format data in the two countries are readily combinable, but the consumption trend data cannot be aggregated for cross-national consumer segmentation.

Cross-national consumer segments of the hypermarket/superstore and the supermarket are found to be different in terms of their demographic characteristics. The former is particularly renowned for its higher income status, while the latter is most probably clustered in the capital city. On the other hand, the insignificance of the country factor in both retail formats implies that hypermarket/superstore and supermarket technologies have successfully transcended national cultures across the two countries.

Cross-national consumer segments of the Internet and the traditional market, though found, are more real in words than in substance because of the significance of the national culture dimension that signifies the impracticability of the formation of pan-country consumer segments for each of these two retail formats. The result is understandable in the case of the traditional market, which has been widely acknowledged as a culturally bound institution. Yet the result is surprising in the case of the Internet, which has been noted as possessing very high internationalization capability and potential to transcend across national cultures. In contrast to the hypermarket/superstore and the supermarket, whose technologies have successfully transcended national cultures across Britain and Taiwan, Internet technology cannot successfully transcend national cultures across the two countries to the extent that cultural groupings are more influential than most of the personal background factors being considered in online shopping decision making.

To ensure the validity of the Internet results that are based on survey data collected in 1998, a similar analysis has been conducted for the year of 2000. The country factor is again found to be more important than many other intra-country variables in deciding whether a respondent conducted online purchase. The result is further highlighted by evaluating Internet usage across Britain and Taiwan in the same year, which points to the

insignificance of the country factor. A comparison of Internet usage and shopping figures between the two countries shows that the percentage of Internet users in Taiwan is higher than that in Britain. Yet when it comes to Internet shoppers, the percentage in Taiwan is much lower than that in Britain. Some underlying factors, rather than general economic factors or the innovation diffusion factor, seem to contribute to the divergence of the intensity of Internet shopping between Britain and Taiwan.

Although the focus of this study is cross-national consumer segmentation, single country user segments of each retail format and consumption trend have been identified, which are particularly necessary when cross-national consumer segments cannot be found. Generally speaking, demographic variables are more likely to be significant in segmenting the use of retail formats, rather than consumption trends, in Taiwan than in Britain.

Conceptually, this study is a first step in establishing a link between cross-national consumer segmentation and internationalization capability/potential of products, by borrowing the knowledge of the former for the assessment and comparison of the latter. The study also demonstrates the potential of exploitation of established national survey datasets. The potential may be even higher if datasets across countries are used together for a particular study, which may lead to discovery of hidden phenomena that are impossible to be found in single country studies. The study also aims at developing quantitative retail choice models, which cover consumer choice and characteristics of and between different retail formats across countries. No such models that are transnational in nature have been developed previously. In addition, this study suggests a new approach and scope in examining retail internationalization, by considering additionally micro-based intra-country demographic variables whilst excluding the unique enterprise factor in assessing retail internationalization covering the Pacific-Rim region. So far retail internationalization has been approached overwhelmingly from the macro-based diffusion or the single enterprise case study perspective, and focused on transatlantic regions. Particularly for the Internet, this study helps to broaden the geographical scope of large-scale and nationally representative online shopping research that goes beyond descriptive analysis, which has been conducted mostly in the context of the US market only. The study also suggests an integrative approach of online shopping research, by combining the intra-country and inter-country approaches that have been currently widely used.

Sufficiently comparable datasets have been successfully identified, and corresponding results that match subsequent research directions have been found. The validity of these results is substantiated by an evident split of usage probabilities between the heavy user segment and the light user segment identified in this study, which signifies the healthy functioning of segmentation power. Furthermore, the synergistic integration of cross-national and intra-national consumer segmentation research efforts as demonstrated in this study increases and proves the overall practicability of such results.

Chapter 1 – Introduction

1.1 Background of the study

Cross-national consumer segmentation, and its link with both internationalisation capability and potential, constitutes the conceptual focus of this study. Cross-national consumer segmentation is one of the two major approaches of international market segmentation, which is an under-researched area in the area of international marketing. Aulakh and Kotabe (1993) reviewed twenty-one major journals in the 1980-1990 period, and identified and categorized articles that belong to the discipline of international marketing. Corresponding results in Table 1.1 show that there were only eleven market segmentation articles, occupying just 1.2% of 893 international marketing articles reviewed. The percentage is even smaller if only empirically based articles are considered. International market segmentation was the least researched subject area in international marketing through the 1980s.

Table 1.1 – International marketing articles[1] by subject category in the 1980-1990 period based on a review of twenty-one journals[2]

Subject category	Total articles	Percentage	Empirical articles[3]	Percentage
Other marketing management issue[4]	102	11.4	32	9.8
Internationalization process	87	9.7	54	16.5
Product	84	9.4	31	9.5
Consumer behaviour	84	9.4	67	20.5
Promotion	71	8.0	33	10.1
Entry strategies	69	7.7	17	5.2
Market globalization process	66	7.4	14	4.3
Channels	49	5.5	22	6.7
Collaborate business arrangement	49	5.5	14	4.3
Investment decisions	40	4.5	11	3.4
Political environment	40	4.5	5	1.5
Legal	35	3.9	3	0.9
Other environment issue[5]	35	3.9	4	1.2
Economic environment	24	2.7	2	0.6
Cultural environment	21	2.4	8	2.4
Pricing	14	1.6	6	1.8
Services	12	1.3	2	0.6
Market segmentation	**11**	**1.2**	**2**	**0.6**
Total	893	100.0	327	100.0

[1] One article may be categorized into more than one subject category

[2] Twenty-one journals reviewed are 'Advances in International Marketing', 'Business Horizons', 'California Management Review', 'Columbia Journal of World Business', 'European Journal of Marketing', 'Harvard Business Review', 'Industrial Marketing Management', 'International Marketing Review', 'International Journal of Advertising', 'Journal of the Academy of Marketing Science', 'Journal of Advertising', 'Journal of Advertising Research', 'Journal of Business Research', 'Journal of Consumer Research', 'Journal of International Business Studies', 'Journal of Marketing', 'Journal of Marketing Research', 'Management International Review', 'Marketing Science', 'Sloan Management Review', and 'Strategic Management Journal'.

[3] Empirical articles are defined as those based on the collection and analysis of primary data

[4] Other marketing management issue includes articles dealing with the whole marketing mix and other marketing management topics that could not be classified under any of the specified marketing management subject categories in Table 1.1

[5] Other environment issue refers to articles dealing specifically with issues other than cultural, political, economic, and legal aspects, and includes those dealing with environmental factors in general

Source: Aulakh and Kotabe (1993)

This study conjectured that the situation may have changed in the 1990s, and therefore conducted a smaller-scale review of selected journals in the 1991-

2000 period. Considering that international market segmentation, and one of its streams – international consumer segmentation – are more likely to appear in journals of international marketing, and probably more likely to be in journals of international business, than those of general marketing and consumer research, the review categorizes relevant articles by journals so as not to average out the different levels of appearance of these relevant articles between different journal types. International market segmentation is essentially an extension of market segmentation (Frank, Massy and Wind 1972), while international consumer segmentation has been treated as a type of international consumer research (Wang 1996). Therefore articles of market segmentation and international consumer research are also highlighted, so as to develop a richer picture of research intensity of the family of international market segmentation.

Table 1.2 - Number of articles relating to 'market segmentation', 'international market segmentation', 'international consumer segmentation' and 'international consumer research' during the 1991-2000 period based on a review of seven journals

Journal name	Market segmentation	International market segmentation	International consumer segmentation	International consumer research
Journal of Marketing	3	0	0	5
Journal of Marketing Research	17	0	0	3
European Journal of Marketing	12	0	0	10
Journal of Marketing Management	3	1	0	2
Journal of Consumer Research	1	0	0	6
Journal of International Business Studies	0	0	0	2
International Marketing Review	0	4	0	18

Results show that there is only one article related to international market segmentation in the five general marketing and consumer research journals. No related article has been found in the Journal of International Business Studies. Although four such articles appeared in International Marketing Review, they occupy only 1.4% of the total number of 279 articles in the journal during the 1991-2000 period, signifying no significant increase compared to the 1980-1990 period covered by Aulakh and Kotabe (1993).

Although the scope of review undertaken in this study is narrower than Aulakh and Kotabe (1993) and categorization of some articles may leave some room for improvement, the paucity of research in international marketing segmentation is clear. This is inconsistent with the fact that internationalisation is becoming more and more important in today's business world (Albaum, Strandskov and Duerr 1998). Taylor (2000) stressed that international marketing segmentation is one of the areas in marketing in need of academic contribution.

The situation is even more acute in a narrower field of international consumer segmentation – the predominant marketing concept applied in this study. During the 1990s, there has been no article related to this academic field in the seven journals reviewed. If viewed in a totality considering all the years and journals, conceptual contributions seem to be more frequent than empirical contributions to international consumer segmentation. In addition, results of most, if not all, of previous empirical studies in international consumer segmentation suffer from the problem of validity because the consumer samples taken were neither large enough nor representative of the population. For example, in Douglas' (1976) study, only 49 non-representative respondents each from the US and France were taken. Malhotra, Agarwal and Peterson (1996) noted that representative sampling, although more appropriate, is not common in cross-national marketing research. The severe lack of this kind of study with more representative samples is probably due to, among others, the complexity of cross-national consumer research design and the difficulty in obtaining data of acceptable quality in foreign countries.

Internationalisation capability and potential of specific products[1], albeit a concept of substantial importance for international marketers, have received some academic attention but has been covered largely only on the surface. For example, Onsvisit and Shaw (1997) noted that Reader's Digest is a global product, because 'the publication uses the same formula for all markets: the same upbeat editorial format, with the same folksy illustrations for the magazine's back cover in all of its editions, although in terms of the content, local stories will be made to particular country markets'. Graham (1996) noted that the Internet is an internationalised product because people in poorer countries are also getting online in huge numbers. Very little, if no, empirical research has been conducted on systematically judging the internationalisation capability and potential of specific products.

Retailing is the gate through which nearly every consumer product has to enter. It is one of the most ancient sectors, notably represented by the traditional market, in every society in the old continents. Yet it is also one of a few sectors that experienced the most revolutionary change in the 20th century. The birth of different types of retail formats – the supermarket, the superstore, the hypermarket, and the Internet by the end of the 20th century, has influenced not only every kind of business, but also people's daily life. Technologies and concepts of these modern retail formats have been transferred into one country after another. In this sense, they are regarded as being embedded with an internationalisation capability and potential to permeate other countries. The country dimension may not be crucial to affecting consumers' usage of these retail formats. A cross-national consumer segment that is immune from the country dimension and is prone to using these formats can be hopefully found. So far no research has been

conducted on internationalisation capability and potential of any retail format.

Consumption trends are closely linked with retail formats in that the former are pursued by consumers through the latter. Consumption trends indicate the prevailing state in the consumption arena, while retail formats reflect the fad in the retailing environment. In a wider sense, retailing and consumption have been found to be closely related to each other at the individual consumer level (Shiu and Dawson 2000). Dawson (1995) noted that retailing is both a proactive and passive agent of consumption. Therefore, research into both retail formats and consumption trends can contribute to a more comprehensive understanding of a retail system.

Consumption trends in today's world seem to be converging across countries. Pursuit of convenience and craving for health are two of such cross-national consumption trends. The former has resulted in an outgrowth of an array of convenience products, such as the Internet, mobile phones, PDA, and many other convenience-oriented consumer electronic products. The latter has spawned a list of health-oriented products, such as fitness training, health resorts and clubs, and even unpolluted fresh air. These trends also permeate the food sectors, which is one of the largest sectors in virtually every economy. Yet little research has been conducted so far on identifying the user segments of either of these two trends in a cross-national context.

So overall there seems to be an increasing number of products, including the Internet, the hypermarket, the superstore, the supermarket, the convenience trend and the health trend noted above, which are regarded as

internationalised products. However, there has not been any empirical research undertaken that assesses how internationalised these products are. The Economic and Social Research Council (2001) recently noticed the academic gap, and identified, in their research program 'Cultures of Consumption', 'indigenisation of transnational products' as a desired study area, whose main research question is as follows:

'Globalization and the convergence of consumer goods and services throughout the world are often assumed to result in the increasing homogenization of cultural values. Yet how far are transnational products indigenized in different countries and continents?'

1.2 Research objectives

Against the research background discussed above, this study aims to respond to major gaps identified in the literature, and accordingly identify three major research objectives, each of which contributes a step in the respective field of research, as follows:

- Conduct empirical cross-national consumer segmentation research that is nationally representative for major retail formats, including the Internet, the hypermarket/superstore, the supermarket, and the traditional market. The external validity of any segmentation result so derived is guaranteed at large, because it is drawn from a pool of representative data. In case cross-national consumer segments for any retail format can be successfully identified, some sort of international marketing segmentation strategy may be viable. Even a failure to locate cross-national consumer segments for some retail format is itself useful, because by then researchers and practitioners should focus upon

the identification of intra-national, rather than cross-national, consumer segments.

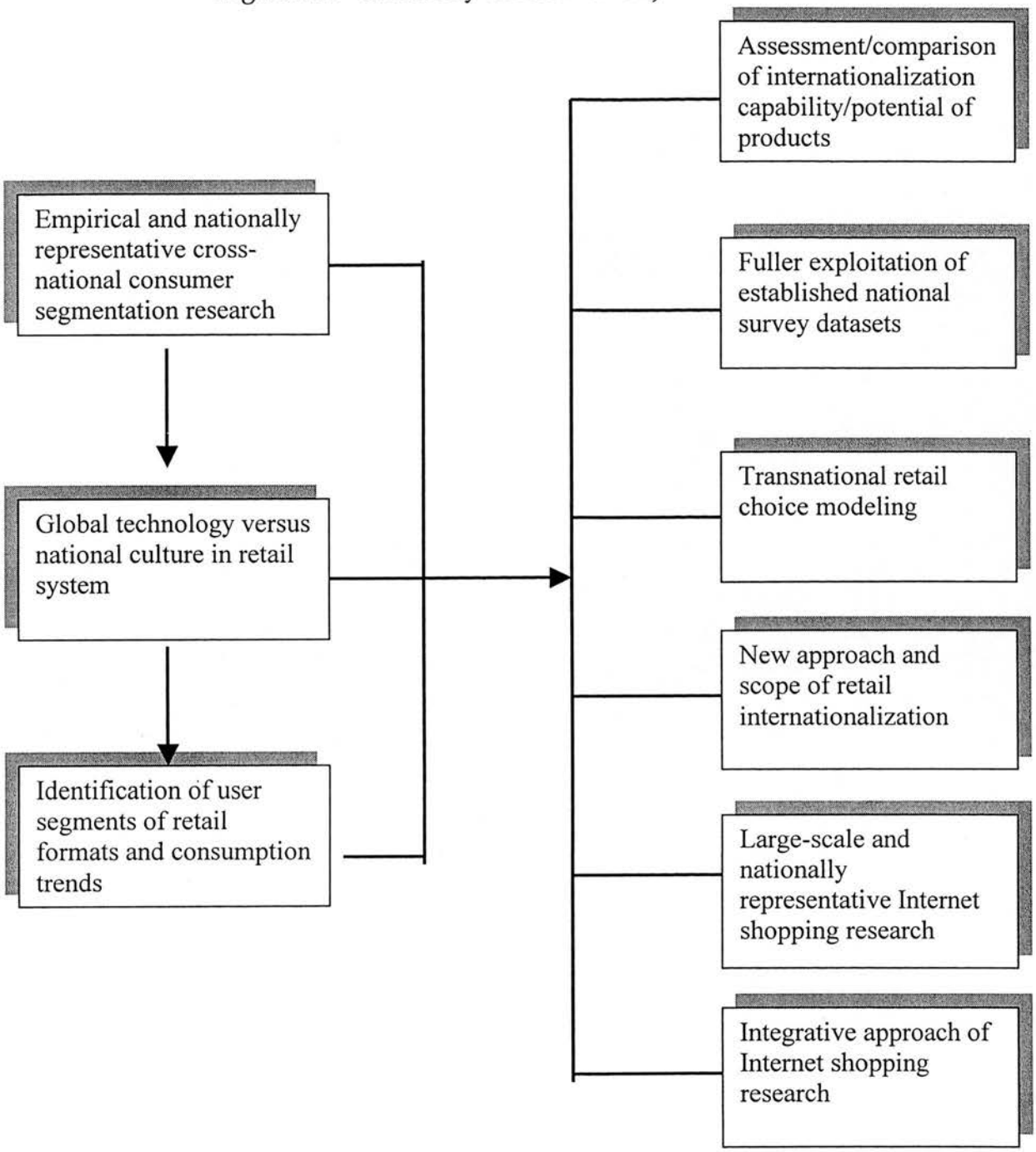
- Evaluate the relative importance of the global technology[2] dimension, which facilitates internationalisation capability and potential, and the national culture dimension, which inhibits internationalisation capability and potential, in consumer choice of the Internet, the hypermarket/superstore, and the supermarket. These three retail formats are commonly perceived as transcending national boundaries. The evaluation is benchmarked by the traditional market, which shows deep-rooted cultural traditions (Goldman 1974; Sommer, Herrick and Sommer 1981; Kaynak and Cavusgil 1982). The relative significance of a specific country variable and a set of demographic variables holds the key to the result of the evaluation. The global technology dimension is more influential if the country variable is found to be statistically non-significant and instead some demographic variables play a more important role in consumer choice of the retail format being studied, so that 'who the consumer is' (represented by demographic characteristics) is more important than 'where the consumer is' (country variable).

- Identify intra-country user segments of different retail formats and consumption trends. A number of market research reports, such as by Healey & Baker (1999) and Mintel (1999), have shown the results of segmentation of different British retail formats. Likewise, similar results such as Council of Agriculture (1998) have been published in Taiwan. However, all these studies used one segmentation variable sequentially. One problem with such an approach is that the single segmentation variable used may be a spurious variable, which draws its impact on consumer choice of a retail format in question from some other 'real' variable. There has been little

research that considers simultaneous effects of several segmentation variables in identifying users of different retail formats. The one-segmentation-variable approach is also prevailing in the segmentation study of food products in Britain (e.g. Ministry of Agriculture, Fisheries and Food 1999a, 1999b; Fine, Heasman and Wright 1996) and Taiwan (e.g. Council of Agriculture 1998). To fill in the gap, this study considers the effects of six segmentation variables – gender, age, occupation, income, household size, and region of residence – simultaneously on different retail formats and consumption trends, so that a more genuine effect, by controlling possible influence of the other five segmentation variables, of any one segmentation variable can be evaluated. O'Brien and Harris (1991) noted that, in Britain, users of retailing come in many forms that reflect the differences in, among others, sex, age and income. Hsu (1996:29) also noted that, in Taiwan, there are many different types of consumers in the retail market, and suggested the use of market segmentation to identify them. The identification of user segments of a particular retail format or consumption trend in this study can enrich our empirical knowledge of the retail system in Britain and Taiwan from a segmentation point of view.

Beneath these three major research objectives, a number of other gaps have been identified (Figure 1.1).

Figure 1.1 - Hierarchy of research objectives



First, an attempt is made to apply cross-national consumer segmentation concepts to a new study area: assessment and comparison of internationalisation capability and potential of products. Cross-disciplinary academic work often produces synergistic effects, which will also be found through the aforesaid application. So far there has not been any work that links cross-national consumer segmentation to international capability and potential.

Second, in order to conduct empirical cross-national consumer research that is nationally representative, national survey data across countries are usually required. This study uses four national survey data sets, namely British Where People Shop Survey, Taiwanese Food Retail and Consumption Survey, Electronic Commerce Survey for Britain and Taiwan, and British National Food Survey. A number of standard and ad-hoc publications using these Surveys have been made. For example, British Where People Shop Survey data have been analysed and results compiled in a management report[3], which uses mainly descriptive statistics to show, among others, the percentage of population, as a whole and by different demographic variables, using each retail format. Taiwanese Food Retail and Consumption Survey data have been analysed using frequency distribution. The percentage of population, as a whole and by different demographic variables, who use each retail format or food product has been calculated. Results are organized in a report called 'Food Retail and Consumption Survey Statistics Book'[4]. Electronic Commerce Survey data have been analysed by using descriptive statistics, and results such as the percentage of online population and the percentage of online buying population are released in the web site[5]. Lastly, the prevailing approach to using British

National Food Survey data is to calculate the average purchase quantities or values of each food item by level of each demographic variable chosen. Results are disseminated in a report entitled 'Household Food Consumption and Expenditure: Annual Report of the National Food Survey Committee'[6]. Statistical information in the forms of tables is separately published in 'National Food Survey: Compendium of Results'[7]. It is evident that the data of these four Surveys have been exploited mostly in a way that generates descriptive information. This study aims to demonstrate that there are some potential values to be exploited beyond the provision of descriptive information of these survey data sets. For this purpose, a variety of statistical techniques will be employed, and collapsing of individual data sets for the purpose of cross-national consumer segmentation will be made.

Third, as shown in the three major research objectives above, major retail formats including the Internet, the hypermarket/superstore, the supermarket, and the traditional market, are the targets of cross-national consumer segmentation in this study. Quantitative models of retail choice have been developed in westernised countries (e.g., Monroe and Guiltinan 1975; Korgaonkar, Lund and Price 1985; Sirgy and Samli 1985;), but no corresponding research has been conducted that is transnational in nature. Moreover, previous quantitative studies in retail choice have been targeted at retail stores rather than retail formats. For those studies of retail formats, most of them focused on consumer choice or characteristics in a single retail format, rather than between different retail formats. For example, Thompson (1967) grouped supermarket shoppers into different types by their price search and quality search behaviour. Hortman et al. (1990) evaluated the effects of different segmentation bases on supermarket patronage. In addition, most of the limited volume of studies that covered different retail

formats provided only descriptive or univariate test results, such as Rivas and Grijalba (1985) who studied Spanish retailing, and Zain and Rejab (1988) who studied Malaysian retailing, rather than established any quantitative models that can explain or predict retail choice being studied.

In view of the gaps of retail choice studies, this study aims at developing transnational quantitative retail choice models, and examining consumer choice and characteristics of and between different retail formats.

Fourth, research efforts on the evaluation of the global technology dimension and the national culture dimension of different retail formats may arguably be categorized into the academic discipline of international retailing, which has been noted for a lack of empirical endeavour (Myers and Alexander 1996). Williams (1992) also noted that international retailing is 'limited to largely fragmented and non-analytical descriptive and prescriptive accounts, which lack an empirical base'. This study disagrees with Williams (1992) and Myers and Alexander (1996), because empirical studies of internationalization of retailing, including retail formats and retail stores, have been conducted from various perspectives as elaborated in the following three paragraphs.

Some of the studies are concerned with the internationalization of particular retail formats in new, usually less developed, retail settings. Burt (1995) noted that most of these studies are in the supermarket, such as Goldman (1974), Goldman (1981), Conners et al. (1985), Kaynak (1985), and Alawi (1986). On the other hand, Ho and Sin (1987) probed into the internationalization of the convenience store. All these studies judged the internationalization performance of a particular retail format being studied

by the macro-based diffusion level in the recipient country, and might seek explanations of the performance. For example, Goldman (1974) attributed the low diffusion level of supermarkets in Turkey to mainly the outreach factor, including spatial, informational, and socio-cultural outreach. Spatial outreach is concerned with higher transport expenditure required for reaching the supermarket. Informational outreach is about the degree of consumer awareness of various shopping alternatives and knowledge of differences between supermarkets and traditional retailers. Social/cultural outreach is related to the emphasis placed on personal relationships with traditional retailers, and unfamiliarity with modern retail environments. However, judging internationalization performance of a particular retail format by the macro-based diffusion level may be misleading because it does not take into account intra-country variables, such as consumer demographics or psychographics, that also play a part in individual consumer choice of the retail format, which in aggregate determine the diffusion level.

Some other empirical studies of retail internationalization adopted a case study of a particular enterprise to reflect the internationalization of a retail format. For example, Kaynak (1980) explored the early internationalization of Migros' supermarkets in Turkey. Truitt (1984), by reviewing the activities of Sears, Roebuck and Co., probed into the internationalization of the mass merchandise store in South America. Lord et al. (1988), on the other hand, used the case of Albert Gubay to examine the internationalization activity of the discount store format. Martenson (1981, 1985, 1988) quoted Ikea's case to study the exportation of a retail concept that moulds the formation of a large non-food store specialist. All these studies provide insights into the judgment of internationalization performance of a particular retail format.

However, this approach of judgment inevitably carries with it the unique enterprise factor. It is very difficult, if not impossible, to disentangle whether the internationalization success or failure of a particular retail format owes more to the enterprise strategy or to the characteristics of the retail format itself in general.

In terms of geographical perspective, empirical studies of retail internationalization as a whole centred on the countries across the Atlantic. For example, Kacker (1985, 1990) and Exstein and Weitzman (1991) examined cross-Atlantic retail internationalization activities from the perspective of America, while Wrigley (1989) and Hamill and Crosbie (1990) studied the same activities from the perspective of the UK. Less emphasis has been placed on Pacific Rim countries.

Considering the gaps arising from the current practices in empirical studies of retail internationalization – namely using the macro-based diffusion level, including the unique enterprise factor, and focusing on transatlantic regions, this study considers additionally micro-based intra-country demographic variables and excludes the unique enterprise factor in assessing trans-Pacific retail internationalization.

Fifth, among the retail formats to be evaluated, the Internet will be given greater emphasis for several reasons. First, the Internet has been popularly regarded as offering growth potential in retailing, which is probably higher than any other established retail formats. Second, as the shopping mode of the Internet is in the early stage of development and has been developing at a fast pace year after year, results drawn from a single year's survey are more likely to be quickly obsolete than those of other established retail formats.

Therefore, the Internet section of this study will be extended across two time periods for identifying any likely change of the results in between. Third, since the Internet is a relatively new retail channel, research on online grocery shopping has been limited (Morganosky and Cude 2000), albeit with a steady increase, compared to other established retail formats such as supermarkets and out-of-town large retail stores. In addition, much of the large-scale research on online shopping was conducted in the context of the US market. For example, GVU (Georgia Tech Graphics, Visualisation and Usability) Centre and WVTM (Wharton Virtual Test Market) carry out continuous consumer survey to monitor the growth of online shopping. Similar research efforts in the US and other countries have been mostly smaller scale and ad hoc in nature. For example, Morganosky and Cude (2000) used only 243 respondents to assess consumer response to and demand for online grocery shopping in the US, while Schuster and Sporn (1998) performed an ad hoc study into online grocery shopping in urban Vienna. This study uses relatively large and nationally representative samples across two time periods of Britain and Taiwan, thereby broadening the geographical scope of large-scale online shopping research that goes beyond descriptive analysis.

Sixth, all the current research efforts on online shopping can be grossly categorized into two approaches. First, analysis was conducted on identifying key characteristics of Internet shoppers or users in a particular country (e.g. Li, Kuo and Russell 1999; Swaminathan, Lepkowska-White and Rao 1999). Second, international comparisons of Internet shopping or usage were made on a country-by-country basis. For instance, Nua Publish (2001) put together a number of surveys, and came up with the sizes of Internet population in different countries. Although these two approaches provide

many interesting and useful results, they fall short of locating any possible cross-national consumer segments displaying similar consumption traits related to the Internet. This study introduces an integrative approach to conducting online shopping research, by combining the two current approaches.

1.3 Structure of the study

The whole study is divided into six chapters. Chapter 1 discusses the background of the study, which culminates into the formation of the topic to be researched. Research objectives are then outlined, which serve as a benchmark against which the forthcoming part of the study is assessed. The chapter finally describes the structure of the study, so as to point out the position of each constituent part in the whole study.

Chapter 2 elaborates the theoretical knowledge that contributes to the conceptualisation and implementation of this study. The knowledge essentially covers three academic disciplines: market segmentation, international market segmentation, and international consumer research, each of which is related in some form to the overriding marketing concept exploited in this study – international consumer segmentation.

Chapter 3 focuses on the empirical knowledge that also contributes to the conceptualisation and implementation of this study. Separation of the whole knowledge input into theoretical and empirical aspects should smooth the flow of ideas and arguments in the study. The distinction between theoretical and empirical knowledge, albeit not so straightforward, will be explained in the beginning of Chapter 3. This chapter covers two broad areas

of concern: macro-based development as well as internationalisation capability and potential of each of the retail formats and consumption trends.

Chapter 4 moves on to the research design of the study. Research design, in brief, is all about choices (Anderson and Alder 2000). The chapter discusses the major choices in the whole research design process, including choice of countries, choice of market context, choice of segmentation targets, choice of measurement of segmentation targets, choice of segmentation base, choice of segmentation techniques, choice of data sources, choice of targets for equivalence diagnosis, and choice of stage of approach to data analysis. Rationales of the decision on each such choice are presented.

Chapter 5 elaborates the analyses and discusses the resulting findings in this study. The analyses here are referred to technical clarifications prior to the running of computer programmes for statistical analysis, with the former in general more complicated and the latter more straightforward than the other. Areas of technical clarifications include recoding the variables, checking multicollinearity, solving non-convergence, and setting up hypothetical regression models for the overall analysis, as well as choosing between the reduced model and the full model, choosing between the inclusion of interaction terms and the exclusion of interaction terms, and choosing between standardized coefficients and non-standardized coefficients for the pan-country analysis. Findings are categorized by the three levels of cross-national consumer segmentation approach, i.e. intra-country analysis, inter-country analysis, and pan-country analysis. All these analyses and findings are based on the data collected on the same year basis of 1998. The only exceptions are those related to the Internet, the study of which spans over the 1998-2000 period.

Chapter 6 concludes the study by firstly assessing whether all the prescribed research objectives in Chapter 1 have been met, discussing some key issues that significantly mould the overall composition, validity and usefulness of the findings, and finally suggesting directions for future research in areas similar to what are covered in this study.

1.4 Chapter summary

Cross-national consumer segmentation, one of the two streams of international market segmentation, is the predominant marketing concept applied in this study. A review of respectable journals covering the two decades from 1980 to 2000 suggests that research work of international market segmentation has been seriously lacking. This is even more acute if narrowing down the focus area to cross-national consumer segmentation. In addition, most, if not all, of cross-national consumer segmentation studies so infrequently found that are empirical based suffer from the methodological weakness of either very small or non-representative samples.

A number of retail formats, including the Internet, the hypermarket/superstore, and the supermarket, have been suggested to carry with them an internationalization capability and potential to permeate other countries. The same conjectured argument may apply to the twin consumption trends of convenience and health too. An attempt at identifying possible cross-national consumer segments, as well as assessing and comparing internationalization potential and potential, which hitherto has been largely conducted on the surface and devoid of systematic elements in the approach taken, of each of these allegedly internationalized retail formats and consumption trends can contribute both academically and

practically to a number of study areas (including international market segmentation, internationalization capability and potential, retailing, and consumer behaviour) within the marketing field.

Accordingly, three major research objectives have been set up in the study. These are (1) empirical and nationally representative cross-national consumer segmentation research, (2) global technology versus national culture in retail system, (3) identification of user segments of retail formats and consumption trends that follows from and acts as a complement to the results of cross-national consumer segmentation. This study also identifies six academic gaps to be filled in. These gaps are assessment and comparison of internationalization capability and potential of products, fuller exploitation of established national survey datasets, transnational retail choice modeling, new approach and scope of retail internationalization, large-scale and nationally representative Internet shopping research, and integrative approach of Internet shopping research.

Before starting the journey of accomplishing the above-mentioned research objectives from the next Chapter onwards, this Chapter ends by outlining the structure of the whole study to be undertaken.

Note

[1] here a wider definition of 'products' is applied, including not only tangible, but also intangible products, such as retail technology, retail concepts, retail services, and consumption trends represented by corresponding tangible products

[2] here 'global technology' is referred to in a broader perspective, including not only hard technology such as Internet technology, but also soft technology such as retail concepts and retail service mix that are new to the recipient retail settings

[3] available from Healey & Baker

[4] available from Council of Agriculture in Taiwan

[5] http://www.tnsofres.co.uk released by Taylor Nelson Sofres Company

[6 and 7] available from Ministry of Agriculture, Fisheries and Food, whose functions have been taken over by Department for Environment, Food and Rural Affairs

Chapter 2 – Conceptual knowledge underpinnings of the study

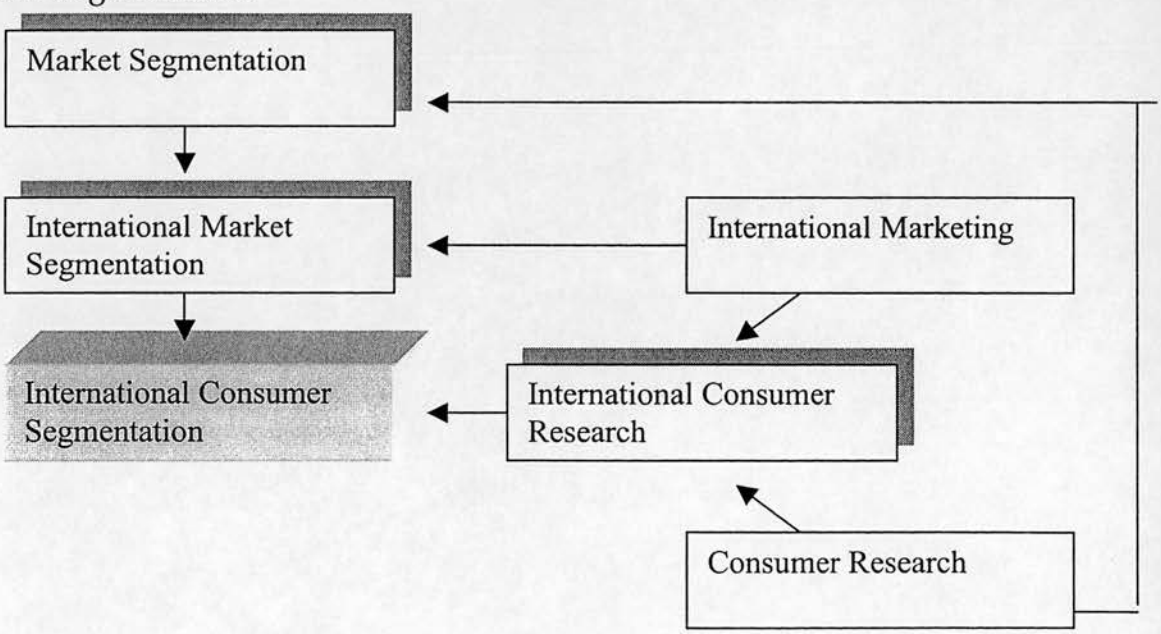
This thesis conducts a cross-national consumer segmentation[1] of retail formats and consumption trends for Britain and Taiwan by using large-scale national survey data in both countries. A literature review of international consumer segmentation finds that it is not an area of academic discipline in its own right. It has been indirectly linked to the study of market segmentation by Frank, Massy and Wind (1972), who proposed one further dimension – national market characteristics – on top of the conceptual framework of market segmentation, which incorporates the use of consumer characteristics as segmentation variables, that they developed. Besides, the ideas of segmentation bases and techniques found in market segmentation literature are also applicable to the study of international consumer segmentation. International consumer segmentation is also regarded as one of the two approaches available within the confine of international market segmentation (Samli 1995). The other approach is market segmentation on a country or regional basis. Studies of international consumer segmentation are also subconsciously taken as belonging to the work of international consumer research (Wang 1996). Although such studies are not specifically labeled so as to differentiate them from other types of studies within the confine of international consumer research, their inclusion in this academic discipline has not raised any academic controversy so far.

Therefore, international consumer segmentation is a stream of three separate, albeit highly interdependent, academic disciplines – market segmentation, international market segmentation, and international consumer research. Their interdependence can be found in a number of ways. First, international

market segmentation is an extension of market segmentation; such an extension indirectly links the general concepts of market segmentation – particularly bases and techniques of segmentation – to international consumer segmentation. Second, both international market segmentation and international consumer research belong to the wider academic discipline of international marketing. Third, both market segmentation and international consumer research are usually covered in modern consumer research course.

This study attempts to synthesize all these academic disciplines by hypothesizing their relationships to each other in general, and to international consumer segmentation in particular.

Figure 2-1 – Academic disciplines contributing to the study of international consumer segmentation



As evident in Figure 2.1, international consumer segmentation is directly related to international market segmentation and international consumer research, and indirectly related to market segmentation, international

marketing, and consumer research. However, the specificity of the indirect relationship is much higher in market segmentation than the other two disciplines. Therefore, three types of conceptual knowledge underpinnings – 'market segmentation', 'international market segmentation', and 'international consumer research', are considered most relevant to the study of international consumer segmentation, and are therefore essential input to the development of the thesis. Accordingly, each of them will be discussed in this chapter. 'Consumer research' and 'international marketing', on the other hand, are much boarder academic disciplines, and are considered too general to be discussed in the study.

2.1 Market segmentation

The concept of market segmentation was introduced to the academic world by Smith in 1956. He stated:

'Market segmentation involves viewing a heterogeneous market as a number of smaller homogeneous markets, in response to differing preferences, attributable to the desires of consumers for more precise satisfaction of their varying wants'.

Thereafter, market segmentation has been honoured as 'one of the most fundamental concepts of modern marketing' (Wind 1978). In academia, this concept has been widely discussed and applied. Wedel and Kamakura (1998) noted more than 1,600 references to segmentation in the current marketing literature, although he did not further specify the time period and the range of marketing literature covered in the search.

2.1.1 Previous segmentation classification work

This thesis uses the concept of market segmentation for researching retail formats and consumption trends across Britain and Taiwan. In this connection, two major issues have to be considered, and decisions made accordingly. The first is concerned with the selection of the base of segmentation. The second is about choosing the technique of segmentation. However, these two issues are not independent. The technique to be chosen has to be based on both the specific purposes of the segmentation study in question and the properties of the segmentation base so determined (Wedel and Kamakura 1998).

Concerning the segmentation base, Frank, Massy and Wind (1972) are one of the earliest groups of researchers to provide a systematic scheme of classification.

Table 2.1 – Frank, Massy and Wind's classification scheme of segmentation bases

		Customer characteristics	
		General	Situation specific
Measures	Objective	Demographic factors (Age, Stage in life cycle, Sex, Place of living, etc.) Socioeconomic factors	Consumption patterns (heavy, medium, light) Brand loyalty patterns (brands, stores) Buying situations
	Inferred	Personality traits Life style	Attitudes Perceptions and preferences

Source: Frank, Massy and Wind (1972)

According to Frank, Massy and Wind (1972), segmentation bases are classified on two dimensions, i.e. customer characteristics and measures (Table 2.1). Customer characteristics can be either 'general' or 'situation

specific'. However, Harrison (1996) criticized the use of the term 'general', which may induce the adoption of segmentation bases too general to have significant bearings on the segmentation target being studied. On the other hand, measures can be either 'objective' or 'inferred'. Objective measures, which stem from factual information, are more reliable than inferred measures.

Based on this classification scheme, Frank, Massy and Wind (1972) developed a conceptual framework that links domestic market segmentation to international market segmentation. They viewed the latter as an extension of the former, by adding one more dimension – national market characteristics - on top of the classification scheme developed for the former.

Table 2.2 – Linkage between domestic market segmentation and international market segmentation

Type of measure by level (object) of segmentation		General	Situation specific
Country characteristics	Objective measures	Geographical location Population characteristics Level of socioeconomic development	Economic and legal constraints Market conditions
	Inferred measures	Cultural characteristics Political factors	Product bound culture and life style characteristics
Decision making unit characteristics	Objective measures	Demographic Socioeconomic	Consumption patterns Loyalty patterns
	Inferred measures	Personality and life style	Attitudes, perceptions, and preferences

Source: Frank, Massy and Wind (1972)

Table 2.2 shows that international market segmentation can be conducted on one of two levels (objects) – country level or decision-making unit level. Adherence to the former level leads to international market segmentation on a country or regional basis. Adoption of the latter level, on the other hand, results in international consumer segmentation. Although Frank, Massy and Wind (1972) suggested the linkage nearly thirty years ago, it is still a generally applicable, clear and concise framework pointing out the relationship between domestic market segmentation and the two approaches (levels or objects) of international market segmentation.

In the same year, Engel, Fiorillo and Cayley (1972) also publicized their classification work on segmentation bases, which are of two types – attribute differences and behavioural differences. Attribute differences refer to variation of characteristics between consumers, and the characteristics can be of demographic, socioeconomic, geographic, or psychological characteristics. Behavioural differences can be either usage factors (e.g. usage frequency, usage pattern) that measure consumer responses objectively, or perceptual factors (e.g. perceived benefits, brand perception) that measure the responses subjectively.

Engel, Fiorillo and Cayley (1972) used their classification work further as representing different approaches to segmentation. They posited that researchers who focus on attribute differences should firstly measure the chosen consumer characteristics, and then work forward to determine the extent of variations in these characteristics relative to variations in their market responses. In contrast, researchers who concentrate on behavioural differences should begin to measure observed variations in consumer

responses, and work backwards to relate to variations in consumer characteristics within the segments formed by consumer responses.

Comparing the work of Frank et al. and Engel et al., the former provided a clearer classification picture of segmentation bases. For example, Engel et al. did not differentiate between attribute differences that are product specific and those that are not product specific. However, Engel et al. made a bold attempt to suggest different approaches to segmentation, which can be viewed as a rudimentary classification work on segmentation techniques developed by future segmentation academics.

More recently, Myers (1996) developed a conceptual framework for classifying segmentation efforts (Table 2.3).

Table 2.3 - Myers' classification of segmentation efforts

	Customer-based	Product/service-based
A-priori		
Post-hoc		

The framework is built on two dimensions. The first is about whether the segmentation work is customer-based or product/service-based. Customer-based segmentation is about focusing on specific customer characteristics (e.g. demographics, psychographics), which help to differentiate between them for segmentation purpose. Product/service-based segmentation, on the other hand, is concerned with ideal attributes, desired benefits, usage rate, usage pattern, usage situation, and other aspects that relate specifically to the products or services.

The second dimension looks into whether the segmentation work is a-priori or post-hoc. A-priori segmentation classifies consumers into segments based on segmentation variables chosen before analysis begins. These variables are known or believed to bear relationship with the consumption of the product or service being studied. On the other hand, segmentation variables used for post-hoc segmentation are derived only after analysis begins. For example, variables, such as attitude, perception, usage rate, and usage pattern, can be retrieved only through the result of the analysis.

This study notes two weaknesses of Myers' classification framework. First, the framework collapses both bases of segmentation (customer-based versus product/service-based) and techniques of segmentation (a-priori and post-hoc) into a four-cell matrix. Yet choice of segmentation base and choice of segmentation techniques are two separate, though inter-related, decisions. So classifying them in different frameworks will provide more clear-cut and detailed information for interested parties. Second, Myers (1996), in building up the framework, provided only the 'skeleton' but not the 'flesh' – no specific mention is made of what is contained within each cell of the framework.

In spite of these weaknesses, Myers' classification work resembles some ideas of both previous and contemporary segmentation academics. His customer-based versus product/service-based proposition is similar to general versus situation specific ideas suggested by Frank, Massy and Wind (1972), but the words used show improvement. Myers' a-priori versus post-hoc dimension is used by Wedel and Kamakura (1998) for building the classification scheme of segmentation techniques.

On top of previous segmentation efforts, Wedel and Kamakura (1998) proposed two classification schemes – one for bases of segmentation and the other for techniques of segmentation – that are each elaborated below.

2.1.2 Bases of segmentation

A segmentation base is defined as 'a set of variables or characteristics used to assign potential customers to homogeneous groups' (Wedel and Kamakura 1998). The two dimensions of segmentation bases proposed by Wedel and Kamakura (1998) are 'general' versus 'product-specific' and 'observable' versus 'unobservable'. A 'general' base is independent of products, services or circumstances. A 'product-specific' base is related to the customer on the one hand, and the product, service and/or particular circumstances on the other hand. The second dimension is concerned with whether the base is 'observable' or 'unobservable'. An 'observable' base can be measured directly, while an 'unobservable' base has to be inferred. Combining the two dimensions produces four categories of segmentation bases (Table 2.4), which resembles the work of Frank, Massy and Wind (1972).

Table 2.4 – Wedel and Kamakura's classification of segmentation bases

	General	Product-specific
Observable	Demographics, Socio-economics, Geographic location	Usage Frequency, Brand loyalty, Stage of adoption, Usage situation
Unobservable	Personality traits, Personal value, Life-style	Psychographics, Attributes, Benefits, Preferences, Intentions

Source: adapted from Wedel and Kamakura (1998)

Observable general bases Table 2.4 shows that demographics, socio-economics, and geographic location are typical variables in this category.

Demographic variables, in a strict sense, are referred to the capture of vital characteristics of human population, such as gender, age, household/family size, family life cycle, marital status, race, nationality, and religion. Socioeconomic variables are related to economic and social classes of the population, such as occupation, income, education, and social class. Geographic variables are concerned with the physical location of respondents, such as urban versus rural.

Observable general bases are accredited with ease of collection, reliability and stability. They are usually readily available mainly from government offices, and therefore can be used as stratification variables. Engel, Fiorillo and Cayley (1972) argued that the greatest strength of using demographics, the pillar of observable general bases, is in the choice of mass media for promotion. Information of mass media users is usually collected on the basis of demographic characteristics and geographic distribution. By locating market segments on the same basis as that of mass media, a more precise fit between media and segment can be achieved.

Studies have shown that demographics are poor predictors of purchase/consumption behaviour (Haley 1968; Frank, Massy and Morrison 1972), and the main reason often cited is that demographics are descriptive rather than causal factors (Haley 1968; Crimp 1985). However, poor prediction, using in terms of low coefficient of determination in regression modeling, does not necessarily lead to it being a poor segmentation variable. It is quite true to posit that demographics are descriptive, but being descriptive itself does not preclude its effective functioning as a segmentation variable. Bird (1987) noted that demographics serve as the skeleton, while 'personality dimensions, attitudes, hopes and fears may put

flesh upon the bones'. Without flesh, we may not be able to understand the wider picture of determinants of consumption behaviour. Without bones, we may not even be able to trace where exactly our customers are. In this connection, Kotler (2000) pointed out that, in case a market segment can be described in non-demographic terms (e.g. certain lifestyle traits), the link back to demographics is still required for estimating the segment size and identifying the appropriate media used.

Observable product-specific bases These are extracted from phenomena of purchase and consumption behaviour, such as usage frequency, brand loyalty, stage of adoption, and usage situation. Twedt (1967) simply dichotomized usage frequency into heavy users and light users. Brand loyalty can be measured by the last brand purchased, or in terms of an exponentially weighted average of past purchase history (Guadagni and Little 1983). With regard to the stage of adoption, Roger's (1962) work was probably the most widely followed. He defined five stages of adoption, namely innovations, early adopters, early majority, late majority, and laggards[2]. If demand is envisaged as significantly heterogeneous in different situations, usage situation is a viable base of segmentation. Belk (1975) described usage situation in terms of its five intrinsic characteristics, namely physical surrounding, social surrounding, temporal perspective, task definition, and antecedent states. Physical surrounding refers to place of purchase/consumption. Social surrounding is concerned with whether other persons are present. The temporal perspective is about the time of day or week. Task definition relates to whether to purchase or to consume. Antecedent states are connected with the buyer's or user's moods or other conditions.

Unobservable general bases These usually fall into any of three groups, namely personality traits, personal values and lifestyle. These bases were extensively developed by marketing academics in the 1960s, as they noticed a need to draw up a more lifelike profile of consumers.

Edward's personal preference schedule is probably the most popular scale for measuring general aspects of personality traits in the marketing field. Early users were, among others, Evans (1959) and Massy, Frank and Lodahl (1968). Other personality traits adopted for segmentation are, among others, dogmatism, consumerism, locus of control, religion, and cognitive style (Gunter and Furnham 1992).

One of the widely used instruments for measuring personal values is Rokeach's instrument (Rokeach 1973). According to Rokeach, personal values are defined as beliefs that certain goals in life (terminal values) and modes of conduct (instrumental values) are regarded as more important than others. The instrument comprises 18 terminal and 18 instrumental values, which are, usually through survey, separately ranked in order of importance by respondents. Another instrument for the same purpose is the list of values (LOV) designed by Kahle (1983). It comprises nine items each of which is rated on a nine-point important/unimportant scale. These nine items are sense of belonging, excitement, warm relationship with others, self-fulfillment, being well respected, fun and enjoyment of life, security, self-respect, and sense of accomplishment.

Lifestyle is composed of three components, i.e. activities, interests, and opinions (Plummer 1974). Examples of activities are work, hobbies, social events, vacation, entertainment, clubs, community, shopping, and sports.

Interests can refer to family, home, job, community, recreation, fashion, food, media, and achievements. Opinions are concerned with, among others, oneself, social issues, politics, business, economics, education, products, future, and culture.

Unobservable product-specific bases These mainly include product-specific psychographics, product perception and importance, benefit perception and importance, and preference and behavioural intention.

Product-specific psychographics can be measured in three aspects, namely value orientations, role perceptions and buying style (Dhalla and Mahatoo 1976). Perception of product attributes is also a viable segmentation basis. Fishbein and Ajzen (1975) added that the importance attached to each product attribute should also be measured. As the benefits consumers look for in products are fundamental in differentiating their purchase/consumption behaviours (Haley 1968), consumers' perception of product benefits and the level of importance attached to each such benefit is also a relevant basis for market segmentation. Preferences and behavioural intentions, another type of unobservable product-specific bases, are heavily related to purchase/consumption behaviour (Fishbein and Ajzen 1975).

Confronted by a broad range of segmentation bases, a researcher has to use some criteria to choose the one that suits him/her most. Myers (1996) noted four criteria. First, the segment so identified must be of sufficient size to justify marketing efforts on serving it. Secondly, the segment must be clearly distinguishable from other segments. Thirdly, it must be accessible to the company's usual promotion and distribution practices. Finally, it should be compatible with the resources and expertise of the enterprise concerned.

Kotler (2000), on the other hand, identifies five criteria. First, substantiality means that the segment should be large and profitable enough so that forthcoming marketing efforts are worthwhile. Harrison (1996) suggested that substantiality be viewed from different perspectives, such as volume versus value, and current status versus future status of the segment. Secondly, differentiability bears the question of whether the segments so formed are distinguishable from each other, and whether they are unique in responding to marketing stimuli. Thirdly, accessibility is about the likelihood of effectively reaching and serving the segments. Following from this is the identification of channels of communication to which the segment is likely to be exposed. Next is actionability, which is concerned with whether marketing plans can be readily designed and implemented to entice and serve the segments. Finally, measurability refers to whether responses from the segment can be precisely assessed. Generally, the more qualitative the data, the more difficult is its measurability. For example, attitudes are more difficult to measure than income. However, procedures (e.g. test-retest procedure) are available to increase the reliability of qualitative responses from the segment.

Following Myers (1996) and Kotler (1994), Wedel and Kamakura (1998) addressed six criteria for evaluating among different segmentation bases. First, substantiality is used to check whether the market size represented by the target segments is sufficient enough for the resulting segmentation strategy to be lucrative. Secondly, identifiability refers to the recognizability of specific groups of consumers through using particular segmentation bases. The easier these segmentation bases help to identify the consumers, the better they are. Thirdly, accessibility is the extent to which the target

segments can be approached through promotional or distributional endeavours. This depends much on the availability and accuracy of data related to particular segmentation bases. Fourthly, actionability is focused upon whether the target segments and the resulting marketing mix aimed at them serve the goals and core competencies of the company involved. Fifthly, stability is concerned with whether the composition or behaviour of the target segments keeps generally unchanged for a sustainable period of time. That period should be long enough for 'identification of the segments, implementation of the segmented marketing strategy, and the strategy to produce results' (Wedel and Kamakura 1998). Last but not least, responsiveness is the degree to which the target segments are susceptive to marketing efforts aimed at them.

Myers (1996), Kotler (1994) as well as Wedel and Kamakura (1998) are three contemporary marketing academics all contributing to segmentation classification work. A comparison of the work among them is shown in Table 2.5, where substantiality/sufficiency, identifiability/distinguish/differentiability, and accessibility were noted in all. 'Compatibility' as suggested by Myers and 'actionability' as worded by Kotler as well as Wedel and Kamakura are similar, though one can argue that whether a segmentation plan is actionable is not always due to enterprise capability, which is what compatibility stresses. Sometimes a segmentation plan cannot be readily designed and implemented for reasons external to the enterprise, e.g. it may induce social criticism if the enterprise takes unfair advantage of vulnerable or disadvantaged groups, such as children or inner-city poor people. 'Measurability' has been suggested by Kotler only. However, one can argue that the question of whether responses from the segment can be precisely assessed has a high bearing on the degree

of stability and responsiveness of the segment. For example, if a segment is formed on the basis of a certain lifestyle trait that is vaguely measured, it is questionable whether the composition/behaviour of this segment can last long, and whether this poorly formed segment is responsive to marketing efforts targeted at it.

Table 2.5 – A comparison of the segmentation classification work of three contemporary marketing academics

Criterion	Myers (1996)	Kotler (1994)	Wedel and Kamakura (1998)
Substantiality	√ (Sufficiency)	√	√
Identifiability	√ (Distinguish)	√ (Differentiability)	√
Accessibility	√	√	√
Actionality	√ (Compatibility)	√	√
Measurability		√	
Stability			√
Responsiveness			√

Words in bracket have same or similar meaning to the corresponding criterion in the first column

Wedel and Kamakura's (1998) arguably provides a more comprehensive criterion set for choosing among different segmentation bases than Myers (1996) and Kotler (1994). In addition, among these three academics, only Wedel and Kamakura (1998) systematically evaluated each segmentation base against his six suggested criteria one by one (Table 2.6). He adopted a rating system that includes five descriptors, namely 'very good', 'good', 'moderate', 'poor', and 'very poor'. This thesis quantifies these descriptors and assigns 5 for 'very good', 4 for 'good', 3 for 'moderate', 2 for 'poor', and 1 for 'very poor'. An overall performance score[3] is then calculated for each segmentation base by summing up its value earned on each criterion.

Results show that the 'observable general' base and the 'benefits' approach of the 'unobservable specific' base turn out to attain the highest overall

performance score. As such, the 'observable general' base will be used as the segmentation base in this study.

Table 2.6 - Rating of segmentation bases

Base / Criterion	Identifiability	Substantiality	Accessibility	Stability	Actionality	Responsiveness	Total score
1. Observable, general	++	++	++	++	-	-	24
2. Observable, specific							
Purchase	+	++	-	+	-	+	21
Usage	+	++	+	+	-	+	23
3. Unobservable, general							
Personality	+-	+	-	+-	+-	-	18
Life style	+-	+	-	+-	+	-	19
Psychographics	+-	+	-	+-	+	-	19
4. Unobservable, specific							
Psychographics	+-	+	-	-	++	+-	15
Perceptions	+-	+	-	-	+	-	17
Benefits	+	+	-	+	++	++	24
Intentions	+	+	-	+-	-	++	20

++ very good; + good; +- moderate; - poor; -- very poor
Source: Wedel and Kamakura (1998) and further quantified in this study

2.1.3 Techniques of segmentation

Section 2.1.1 above notes that Engel, Fiorillo and Cayley (1972) suggested two broad approaches to segmentation – attribute-to-behaviour forward approach and behaviour-to-attribute backward approach. This suggestion, albeit valid, is at best a general idea, which makes no mention of specific segmentation techniques/set of segmentation techniques. Myer's (1996) a-priori versus post-hoc suggestion, on the other hand, provides a more concrete idea of sets of segmentation techniques (a-priori and post-hoc) that are available. This forms one of the two dimensions adopted by Wedel and Kamakura (1998) for constructing his classification scheme of segmentation techniques.

A handful of statistical techniques that can be used for segmentation have been developed and used over the last decades. Wedel and Kamakura (1998) categorized them on the basis of two dimensions. As just mentioned, one

such dimension is a-priori versus post-hoc one (Green 1977; Wind 1978). A segmentation technique is a-priori if the type and number of target segments are predetermined. It is post-hoc if the type and number of segments have to be decided by referring to the results of data analysis. Wedel and Kamakura's second dimension is concerned with whether descriptive or predictive statistical techniques are used. Descriptive techniques relate to the analysis of associations across a particular set of segmentation bases, and there is no distinction between dependent and independent variables. Predictive techniques are adopted to test how the dependent variables are explained or predicted by the independent variables. Specific techniques of segmentation that fall into any of the four cells on the basis of the two said dimensions are noted in Table 2.7.

Table 2.7 - Wedel and Kamakura's classification of segmentation techniques

	A-priori	Post-hoc
Descriptive	Contingency table, Log-linear modeling	Non-overlapping, overlapping, and fuzzy clustering
Predictive	Contingency table, Regression, Discriminant analysis	Automatic interaction detection, Conjoint analysis

Source: adapted from Wedel and Kamakura (1998)

In using a-priori descriptive segmentation techniques, the type and number of segments are determined prior to data collection. A number of segmentation variables (e.g. gender, age, occupation) are often used simultaneously to form the segments. These segments are rationalized by evaluating the relationship between segments so formed and segmentation variables used. If the relationship is significant, the segments are deemed viable. Two common a-priori descriptive segmentation techniques are contingency table and log-linear modeling. Contingency table provides the insight of the associations between each predetermined segment and

segmentation variable(s) chosen. However, this technique suffers from the difficulty in detecting and interpreting higher order interactions (Green, Carmone and Watchpress 1976). Log-linear modeling serves the same purpose as contingency table of associating between the predetermined segment and segmentation variable(s). The advantage of the former is that higher order interactions are more readily to be diagnosed.

In post-hoc descriptive segmentation, the number and characteristics of segments are determined by the data and methodology used in the study. Clustering methods are the primary technique for this kind of segmentation where no response variable is involved (SPSS 1998). Cluster analysis partitions respondents into homogeneous groups based on their statistical proximity to each other. According to Hruschka (1986), there are three types of clustering methods: non-overlapping, overlapping, and fuzzy. In non-overlapping clustering, each respondent is assigned to one segment only. In overlapping clustering, a respondent may be assigned to more than one segment. Non-overlapping clustering is further categorized into hierarchical and non-hierarchical approaches. Hierarchical non-overlapping clustering presumes that two consumers assigned to the same segment in the early stage of the clustering process will remain in the same segment throughout the process. Non-hierarchical non-overlapping clustering will reassign consumers to clusters throughout the process, so as to optimize a certain statistical criterion. Therefore, two consumers who are in the same segment at an earlier stage may be in different segments finally. In fuzzy clustering, membership or non-membership in any segment of a respondent as decided in the previous two clustering types is replaced by the degree of membership in each segment. For example, a respondent may be assigned to 60% of segment A, and 40% of segment B.

A-priori predictive segmentation first identifies a-priori descriptive segments based on certain criteria, for example heavy, medium and light users based on usage frequency, and then applies some predictive techniques to probe into the relationship between such segment membership and a set of segmentation variables. Three common predictive techniques are contingency table, regression, and discriminant analysis. Contingency table is the most basic a-priori predictive segmentation technique. It shows average values of the dependent variable on different levels of one or more segmentation variables acting as predictor variables (Bass, Tigert and Lonsdale 1968). One weakness of contingency table is its difficulty in dealing with two or more segmentation variables simultaneously. Regression, which has the capacity of involving the use of several segmentation variables for predicting the dependent variable, can estimate the simultaneous effects of multiple segmentation variables and calculate partial contribution of each of these variables (Wildt and McCann 1980; double checking). In addition to the conventional type of regression whose dependent and independent variables are of integer variables, non-conventional regression techniques that lift the restriction that all the variables are integer variables are also popular. Two such non-conventional regression techniques are logistic regression and Poisson regression. The former allows for the use of dependent variables that are categorical. The latter is specifically suited for dependent variables that are count number. These two non-conventional regression techniques will be used in this thesis, and more detailed explanations of them will be given in Chapter 4 that deals with research design of the study. Discriminant analysis aims at establishing a model predicting, on the basis of a set of segmentation variables, which segment respondents belong to. In this sense, it has the same broad purpose as

logistic regression. The main difference between the two techniques is that discriminant analysis sets up stricter assumptions about predictor variables, which have to envisage a multivariate normal distribution with identical population covariance matrices for each segment so formed (SPSS 1998).

Post-hoc predictive segmentation estimates the relationship between a dependent variable and a set of segmentation (predictor) variables, and then uses it as the basis for segmentation. Each of the segments so formed is homogeneous in terms of the relationship aforesaid. Two popular post-hoc predictive techniques are automatic interaction detection (AID) and conjoint analysis. AID provides a heuristic method of examining a set of categorical segmentation variables, so as to identify the combinations of categories that produce the highest percentages in the desired outcome condition (SPSS 1998). Segments so formed differ maximally in terms of the segmentation target, on the basis of a set of segmentation variables. Conjoint analysis is a decompositional technique for measuring preferences, whose measurement parameters are elicited from respondents' overall evaluative responses to a variety of attributes and levels of the product in question (Green and Srinivasan 1990; double checking). Attributes are often functional or physical attributes, such as the presence of power steering in cars or the amount of fluoride in toothpaste. Four conjoint model types are available to measure respondents' multi-attribute preferences (Wedel and Kamakura 1998). The vector model posits that preference will increase if the value of the attribute increases. The ideal-point model presumes that preference is maximal at the ideal point and will decrease with movement away from that point. The part-worth model assumes that each level of the attribute possesses a unique part-utility, i.e. an integral part, which is independent of

other parts, of the total utility. The mixed model combines the ideas of the previous three models.

Very little work has been conducted on suggesting a set of criteria for assessing a wide range of segmentation techniques just described above. This is in sharp contrast to the corresponding work on segmentation bases, which as mentioned before has been done by a number of marketing academics. Fortunately, Wedel and Kamakura (1998) listed a set of criteria as against segmentation techniques, and provided a systematic assessment of each segmentation technique on the basis of criteria so determined.

The five criteria suggested by Wedel and Kamakura (1998) are 'effectiveness for segmentation', 'effectiveness for prediction', 'statistical properties', 'applications known', and 'availability of programs'. The same rating system as that used for evaluating segmentation bases (section 2.1.2 above) is adopted. This study quantifies the rating system in the same way as that done for evaluating segmentation bases. An overall performance score is calculated for each segmentation technique (Table 2.8).

Results show that the two 'a-priori/predictive' segmentation techniques, namely regression and discriminant analysis, get the highest overall performance score. As such, regression analysis will be used as the major segmentation technique in this study.

Table 2.8 – Rating of segmentation techniques

Technique / Criterion	Effectiveness for segmentation	Effectiveness for prediction	Statistical properties	Applications known	Availability of programs	Total score
1. A-priori, descriptive						
Cross tabs	+-	--	+	++	++	18
Log linear models	+-	--	++	++	++	19
2. A-priori, predictive						
Regression	-	++	++	++	++	22
Discriminant analysis	-	++	++	++	++	22
3. Post-hoc, descriptive						
Non overlapping	++	--	-	++	++	18
Overlapping	++	--	-	--	-	11
Fuzzy	++	--	-	+-	+	15
4. Post-hoc, predictive						
AID	+-	+	-	++	+	18
2-stage segmentation	+	+	-	+	+-	17
Clusterwise regression	++	++	+-	+	+	21
Latent class regression	++	++	+	+	-	20
Latent class MDS	++	+	+	+-	-	18

++ very good; + good; +- moderate; - poor; -- very poor
Source: Wedel and Kamakura (1998) and further quantified in this study

2.2 International market segmentation

The preceding section notes an abundance of studies that referred to the concept of market segmentation. A closer scrutiny of previous segmentation efforts, however, reveals that most of them were conducted in the domestic settings. Douglas and Craig (1992) stated that

'Segmentation is a central issue in domestic marketing strategy. Yet, in international markets it has received little attention.'

This is at odds with an increasingly popular trend of internationalization activities in the business world (Albaum, Strandskov and Duerr 1998), which has aroused academic endeavours in probing into the causes. Winram (1984) attributed the phenomenon to an increase in cross-border population mobility and information mobility, which induce a convergence in habit, life-style and culture amongst consumer market segments across the world. Porter (1986) identified five other contributory factors. These are as follows:

1. Growing similarity in available infrastructure, distribution channels and marketing approaches amongst countries;
2. Fluidity in global capital markets enabling large flows of funds between countries for carrying out internationalization;
3. Technological revolutions that reshape global market competition;
4. Technological advances that contribute to cost reductions and increased impacts of products, thereby allowing them to be accessible to more global consumers;
5. Shift of competitors from traditional country competitors to emerging global competitors.

More recently, Dahringer et al. (1994) suggested that internationalization is mainly attributable to consumers 'increasingly exposed to global media, international travel, new products, consumption patterns, and technologies'. In the same year, Luostarinen (1994) noted that the internationalization trend is propelled by a wide range of factors, including, among others, deregulation of capital markets, increase in area integration, surge of market economy systems in Eastern Europe and Asia, development of instantaneous international communication, end of the cold war, and increased international awareness of people. On the other hand, Hart and Murphy (1998) proposed the concept of consumer convergence that is mainly caused by the advance of communication technology and the narrowing gap in international living standards.

The internationalisation trend should lead to an increasing use of market segmentation in the international scene. This is because segmentation is potentially beneficial and often more important for international markets

than domestic markets (Albaum, Strandskov and Duerr 1998). Generally speaking, international markets are more heterogeneous in nature and thus more susceptible to be formed into distinct market segments, and they are larger in size than domestic markets thereby allowing the focus on just a portion of the international markets yet still profitable.

There are two broad approaches to international market segmentation (Samli and Hill 1998). The first approach is of macro-level nature, which involves the use of macro-level variables such as language, religion, geography, economic bloc, and economic development. These variables are stereotypical, which stand for certain general phenomena of the country (Peterson and Malhotra 2000). The second approach is micro-level, which most often uses individual-level or household/family level variables, for international market segmentation. This usually necessitates the deployment of consumer survey for obtaining the required micro-level data.

Greater academic efforts have been made using the macro-level approach than using the micro-level approaches. This should be quite much attributable to the issue of data availability. Macro-level data, such as GDP per capita, are readily available in nearly every economy. In contrast, it is much harder to acquire comparable micro-level data across countries. The greater emphasis on macro-level as opposed to micro-level approach leads to Samli (1995) labeling macro-level as 'conventional', and micro-level as 'unconventional' approach of international market segmentation.

The macro-level approach classifies country groups on either only one dimension (e.g. GNP per capita) or multiple dimensions. Typically these dimensions are drawn from any of the variables in Table 2.9.

Table 2.9 – A pool of variables used for macro-level international market segmentation

Construct	Variables
Aggregate production and transportation	Number of air passengers / kilometer
	Air cargo (ton / kilometer)
	Electricity production
	Number of newspapers
	Number of cities with a population of over 100,000
	Population
Personal consumption	Income per capita
	GNP per capita
	Cars per capita
	TV sets per capita
	Energy consumption per capita
	Hospital beds
	Newspaper circulation
	Electricity production per capita
	Telephones per capita
	Radios per capita
	School enrolment per capita in population 15-19 years old
	College, university, and professional school education per capita in population 15-64 years old
Trade	Imports / GNP
	Exports / GNP
	Consumer price index
Health and education	Illiteracy among adults 15 years and older
	Percent of population in agriculture
	Life expectancy
	Physicians per capita
	Number or cities with a population of under 100,000
	School enrolment per capita in population 5-14 years old
	Political stability

Source: Jain (1993)

Two recent large-scale macro-level international market segmentation studies are Helsen, Jedidi and DeSarbo (1993) and Peterson and Malhotra (2000). These two pieces of work are noteworthy because they pioneered use

of some new segmentation variables different from traditional macro-level variables such as those listed in Table 2-8.

Helsen, Jedidi and DeSarbo (1993) used a novel variable, multinational diffusion patterns for their segmentation study. They used annual unit sales data across countries of three consumer durables (colour television sets, video cassette recorders, and compact disc players), and applied a latent structure technique of analysis to calculate three parameters representing the diffusion patterns. These parameters are propensity to innovate, propensity to imitate, and time to peak sales. Results show that country-level market segments determined by multinational diffusion patterns are remarkably different from those adopting traditional measures, such as population size, GDP per capita, and consumer price index.

Peterson and Malhotra (2000) designed an objective quality-of-life (QoL) - or material conditions of living – measure that combines six variables. These six variables are cost of living, health, freedom, economic prosperity, culturtainment (recreation, culture, and entertainment), and infrastructure. They then used the clustering technique to segment 165 countries on the basis of the derived QoL measure. The twelve clusters of countries so formed are shown in Table 2.10.

Table 2.10 – Twelve clusters of countries based on quality-of-life measure[1]

Cluster	Examples of countries[2]
Sun coasts	Antigua; Uruguay
Cost of living and freedom alright	Bolivia; Zimbabwe
Outposts	Bahamas; United Arab Emirates
Worst health	Afghanistan; Zambia
Next to the bottom	Cameron; Senegal
At the bottom	Benin; Uganda
Worst cost of living and freedom	Congo; Iraq
Poor freedom	Albania; Vietnam
Small but rich	Bahrain; Nauru
Best cost of living	Chile; Yugoslavia
First world – cost of living alright	Andorra; USA
First world – cost of living not alright	Finland; Switzerland

[1] Data used for clustering were collected in 1990

[2] Only two countries are taken from a list of countries, arranged in alphabetical order, in each cluster as examples. The first country and the last country on the list are chosen

Source: adapted from Peterson and Malhotra (2000)

The macro-level approach, albeit more widely used, is not immune from criticisms. This approach may result in the perpetuation of consumer stereotypes. For example, Dichter (1962) reported that one out of every three Frenchmen brushes his/her teeth, and four out of five Germans change their shirts once a week. Yet membership in a common culture or society does not necessarily lead to similar response patterns (Douglas 1976). Several sub-societies may show greater variation in selected phenomena than what between-country comparisons demonstrate (Oyen 1990). Put it in the other way round, a sub-society may have some behavioural patterns more similar to a comparable sub-society in another country than to other sub-societies within the same country (Thorelli, Becker and Engledow 1975).

Douglas (1976) is one of the earliest studies using the micro-level approach for a number of products and services in the US and France. This study interviewed 98 wives in each of the two countries. Half of the respondents in each country were working wives and another half were not. Results show that between-country difference (working versus non-working) is more influential than within-country difference (working versus non-working) in explaining the variations in purchasing behaviour patterns between the two countries.

Douglas's (1976) work contributed to the knowledge base of micro-level international market segmentation. However, there is still some room for improvement arising from her work. First, the sample size is very small, and therefore the results could not be convincingly representative of the countries being studied. Second, only one demographic variable (working versus non-working) was used. There might be other variables, such as income and household size, which could significantly account for the purchasing behaviour patterns between the two countries. Third, both the US and France are developed countries. It is tempting to extend the scope of countries being studied by covering newly industrialized countries, which have witnessed notable success since the work of Douglas (1976).

One of the most systematic efforts on comparing macro-level to micro-level approach of international market segmentation was made by Samli (1995). He looked to the macro-level approach as a conventional wisdom, and the micro-level approach as unconventional. His work, essentially a revision of Hassan and Samli (1994), is shown in Table 2.11.

Table 2.11 – Comparisons between the macro-level and micro-level approaches of international market segmentation

	Macro-level approach	Micro-level approach
1	Assume heterogeneity between countries	Assume cross-national market segments
2	Assume homogeneity within country	Acknowledge within-country differences
3	Based on macro-level variables of segmentation	Focus on certain peculiarities of consumer behaviour
4	Concentrate heavily on macro-level cultural differences	Emphasize both commonalities and differences at the micro-level
5	Choose methods of segmentation based on clustering country markets	Choose methods of segmentation based on grouping or clustering market segments within a country or between countries
6	Give secondary priority to within-country segments	Give top priority to within-country segments
7	Place primary emphasis on country-wide market considerations	Do not treat country-wide market considerations as so important
8	Place major emphasis on similarities	Place major emphasis on differences

Source: adapted from Samli (1995)

Samli's (1995) work notes that, firstly, the macro-level approach assumes heterogeneity to be present only between countries. This is generally not true. For example, northern Italy may be more similar to southern France than southern Italy. In contrast, the micro-level approach states that there could be segments displaying similar consumption behaviour across countries. For example, yuppies can be found beyond many national boundaries.

Secondly, the macro thinking assumes homogeneity within any given country, but the micro thinking acknowledges that different market segments within a country could vary significantly in terms of their consumption behaviour.

Third, the macro-level perspective adopts only macro-level variables, such as culture, economic development, and geography, for segmentation. By contrast, the micro-level perspective treats consumers (individual consumers, household/family consumers, or institutional consumers) as the unit of analysis, and extracts some characteristics (such as demographics or psychographics) of them as the segmentation variables.

Fourth, culture, as mentioned in the preceding paragraph, has been adopted for international segmentation. Yet this is used primarily on the macro-level basis, such as individualistic versus collectivist culture as exemplified in the study of US versus India by (forget author name). However, the micro-level approach acknowledges the existence of both commonalities and differences in cultural traits between countries on an individual basis. For example, pop culture can be identified in particular consumer segments across countries.

Fifth, an essential logic of the macro idea is to choose particular segmentation methods that can categorize various country markets into clusters. On the other hand, the micro idea adopts segmentation methods that can form within-country and between-country market segments.

Sixth, the macro approach focuses on country-level segmentation, and inevitably places little emphasis on possible contrasting segments within a country. The micro approach, on the contrary, assigns top priority to the identification of distinct market segments within the country.

Seventh, the macro-level perspective emphasizes on countrywide market considerations, such as general economic conditions measured by a number of economic indexes. In contrast, the micro-level perspective posits that

country markets should be examined for substantial, identifiable, accessible, actionable, stable, and responsive portions.

Last but one of the most fundamental differences between the two approaches is that the macro-based thought concentrates on finding out the similarities among various country markets. The micro-based thought stresses differences, believing that the more we understand the differences, either within-country or between-country, in the world market, the better will be marketing's delivery of value.

In spite of the vast differences between the macro- and micro-level segmentation approaches, they are not mutually exclusive. Kale and Sudharshan (1987) proposed a technique, called 'strategically equivalent segmentation (SES)', that attempts the integration of the two approaches. The technique is concerned with four sequential key steps of international market segmentation. Step 1 is 'criteria development', which involves the development of dimensions to determine whether a particular country is qualified for market entry. Step 2 is 'screening', which essentially uses the predetermined dimensions to filter the list of countries as entry candidates. Step 3 is the use of 'micro-segmentation', which involves not only the attempted identification of international micro segments, but also the calculation of size of the micro segments concerned in each selected country. Step 4 is 'SES creation', which constitutes two components. The first is to connect various micro segments across countries on the basis of, for example, shopping and/or purchase behaviours, so as to create different international micro segment groups. The second is to conduct a cost-benefit analysis of each micro segment so selected. Steps 1 and 2 of Kale and Sudharshan (1987) can be expedited as a result of the macro-level approach, while the

processing of steps 3 and 4 can borrow from the results obtained from the micro-level approach.

Later on, Hassan and Samli (1994) made a similar, but more explicit, suggestion that the macro-level approach can be initially adopted for the selection of countries, and the micro-level approach is then used to identify cross-national consumer segments within the countries so selected. Hassan and Samli (1994) called it the 'hybrid' approach.

The 'SES' technique or the 'hybrid' approach is theoretically more comprehensive than the adoption of only the macro- or the micro-level international segmentation approach. However, probably because of the difficulty in simultaneously obtaining both country-level and individual-level data, there has not been a single piece of academic paper that could empirically apply the technique/approach. As Yavas, Verhage and Green (1992/3) noted, 'the idea of reconciling the different viewpoints ... is intuitively appealing and certainly represents a significant forward link ... However, empirical support to he viability of this middle ground approach ('SES' technique or 'hybrid' approach) is scanty and evidence to its efficacy comes mainly in the form of anecdotes'.

In view of the much greater difficulty in empirically applying the 'SES' technique or the 'hybrid' approach, and a number of weaknesses of the macro-level international segmentation approach, the micro-level international segmentation approach deserve comparatively greater academic attention. Dahringer et al. (1994) noted a number of benefits of using the micro-level approach to identify cross-national consumer segments, who carve similar products and services they have heard about,

seen, or experienced. Cross-national consumer segments are defined as 'groups of buyers that share the need and desire for a product and the ability to pay for it rather than those who share a national border' (Blackwell, Ajami and Stephan 1994).

The most appealing benefit of successfully identifying cross-national consumer segments is the experience curve effect. There are two sources of such an effect: production and marketing. The first source is well known in basic economics: economies of scale via a higher level of standardized production. The second source, which is concerned with the manipulation of the marketing mix, is considered potentially more important. The marketing mix is viewed as an asset base similar to production facilities. When an enterprise coordinates its marketing mix across countries and makes only necessary adjustments, the average unit cost of marketing decreases.

In addition, searching for cross-national consumer segments can assist enterprises in avoiding the trap of standardisation when target country-markets are significantly different, and refraining from excessive custom-tailoring when target country-markets are sufficiently similar.

There have been a few studies that used the micro-level international segmentation approach to identify cross-national consumer segments. Hassan and Katsanis (1991) identified the 'global elite' segment who are usually well educated, earn high income, lead an 'elite' way of living, and are more inclined to wear clothes of world-class brand than other people. They also identified the 'global teenager' segment who are supporters of cutting edge fashions and pop music. Anderson and Engledow (1977) identified a 'cross-cultural elite of affluent and information sensitive consumers', who are

keen to receive information. Beatty et al (1991) extended the concept of international consumer segment to gift giving, and identified 'self respect givers' and 'relationship givers'. This may help in launching gift products across countries. Verhage, Dahringer and Cundiff (1989) located three cross-national consumer segments useful for 'energy conservation' products or services. A common trait of the conclusions of these studies is that people of certain characteristics, irrespective of the country where they live, are more likely to use/follow the internationalised product/service/idea being studied than other people.

2.3 International consumer research

The study of consumer behaviour was developed rapidly in the 1960s (Wang 1996). This helped its 'international' stream - international consumer research – to occupy a niche of academic spotlight. However, its development significantly lagged behind that of domestic, usually referred to as American, consumer research.

Nevertheless, during the decade of 1960s, consumer researchers began to notice the importance of understanding basic consumer similarities and differences between countries. For example, Elinder (1965) noted the divergence of consumption patterns between European countries. Over that period, multinationals emphasized on their manufacturing and market aspects from a technological point of view. However, Dichter (1962) suggested that they should also study the culture and psychology of people in other countries. Wind (1967), on the other hand, placed equal emphasis on similarities and differences between countries. The essence of his argument is that consumer heterogeneity exists within and between countries. Therefore, it is not appropriate to view each country as a homogeneous

market. Rather, disaggregation is required to grasp differences within a country. This is probably one of the earliest viewpoints parallel to the concept of cross-national consumer segmentation applied in this study.

The 1960s is the embryonic stage of international consumer research. Not surprisingly, studies in this period suffer from a number of limitations. Wang (1996) noted four such limitations. First, the range of countries, most of them in Europe and North America, being compared is quite limited. Second, the scope of research covered is quite narrow. For example, contemporary concepts appearing in domestic consumer research, such as personal influence, perceived risk, and involvement, could scarcely be found in international consumer literature. Third, the methodology used is not sophisticated, as many studies borrowed tools and knowledge from cultural anthropology. Fourth, many studies focused on idiosyncratic consumer behaviour patterns, but generally lacked corresponding theoretical explanations. Therefore, the theoretical framework was undeveloped in this period.

International consumer research progressed into the infancy stage in the 1970s. Wang (1996) noted the progress in a number of fronts. First, the scope of research is wider than the previous decade. Areas that had not been covered before, such as brand loyalty, consumption pattern of working and non-working wives, family buying decision, lifestyle, perceived risk, and purchase role, were studied from an international perspective in this period. Second, researchers went beyond the perspective of cultural anthropology, and took note of methodology issues that international consumer research particularly requires, such as measurement reliability and validity. Third, some conceptual thinking and theoretical frameworks were developed. In

this regard, Sheth and Sethi (1977) rolled out the first cross-cultural consumer behaviour model, which attempts to 'integrate research from anthropology and diffusion theory and apply it to the area of cross-cultural buyer behaviour'.

Researchers in this decade continued the study of consumer similarities and differences between countries that had been started by researchers in the preceding decade, such as Elinder (1965), Dichter (1962), and Wind (1967), as noted above. However, more empirical work can be found in the 1970s. For example, a segment of 'universal information seekers' that transcend different industrialized countries has been identified by Anderson and Engledow (1977). This study provides evidence that cross-cultural similarities in information seeking obliterate long established national differences. Some researchers, on the other hand, worked on the opposite. For example, Douglas (1976) found that country difference was more influential than difference between working and non-working wives in explaining the purchasing patterns of the US and France. Douglas and Urban (1977) also found that segments of same demographic characteristics, such as teenagers, across countries, may not show similar behaviour patterns. It is difficult to generalize a rule to the relative importance of within-country diversity and between-country variance, because this should depend much on the countries being covered, the product being examined, and the time period on which the study is based.

Although noticeable progress was evident in this decade, the geographical scope was still largely confined to industrialized countries.

International consumer research entered the growth stage in the 1980s and the early 1990s (Wang 1996). The geographical scope was extended to some developing countries, so that more global consumer segments could be identified. Examples are pro-energy conservative consumers (Verhage, Dahringer and Cundiff 1989), elite life style consumers (Hassan and Katsanis 1991), and teenager consumers (Hassan and Katsanis 1991).

In this growth period, the scope of research continued to expand to new areas such as consumption values, purchase motive, and social status. However, country-of-origin effect seems to be the most prolific topic over the period. The period also saw a heightened attention to concomitant methodology issues, and brought to light a number of methodological studies. For example, Davis, Douglas and Silk (1981) found no consistency in reliability of different types of measurements for any national sample or language group examined. Parameswaran and Yaprak (1987) provided evidence that the same research instrument may lead to different reliability levels for different country samples. Yu, Keown and Jacobs (1993) noticed that research findings may be significantly affected by country and type of attitude scale, thereby positing that attitude measurements such as Likert and semantic differential scales are culture-specific research instruments.

2.4 Chapter summary

International consumer segmentation, the predominant marketing concept applied in the study, is not an area of academic discipline in its own right. Instead the concept is a stream of three separate, albeit highly independent, academic disciplines – market segmentation, international market segmentation, and international consumer research. This chapter discusses each of these three disciplines with particular reference to its relationship to

international consumer segmentation. In so doing a clearer position of the expected contributions of the study can be crystallized, and a clearer idea of how to proceed with the study, such as the segmentation base and techniques to be adopted, can be formulated.

Market segmentation studies have been abundant since the 1950s, and the market segmentation concept has been continuously enriched. This chapter discusses the development of the segmentation classification work, including Frank, Massy and Wind (1972), Engel, Fiorillo and Cayley (1972), Myers (1996), as well as Wedel and Kamakura (1998). Specifically two major aspects of market segmentation – bases and techniques - are elaborated. A rating of different segmentation bases shows that the 'observable general' base, which will be chosen in this study, achieves one of the highest scores. The same rating system applied to segmentation techniques indicates that a-priori predictive techniques, including regression to be adopted in this study, get the highest overall performance score vis-à-vis every other considered technique.

The abundance of market segmentation studies, which are mostly focused upon the domestic settings, does not translate into a rich stock of international market segmentation research. This is at odds with the increasingly popular trend of internationalization activities in the business world. Among a limited number of existing international market segmentation studies so found, the macro-level approach has been adopted far more frequently than the micro-level approach. However, the former has been repeatedly criticized as leading to the perpetuation of consumer stereotypes. It is further attacked in a number of fronts by Samli (1995). Later on conceptual frameworks that integrate the two approaches have been

suggested, but they may be liable to empirical impracticability. These arguments in aggregate contribute to the reasoning of adopting the micro-level approach in the study.

International consumer research began to steal a little academic spotlight since the 1960s. The scope of topics covered has been continuously enlarged, which in the 1990s has reached to the discussion of consumption values, purchase motive, social status, and country-of-origin effect. This thesis extends the scope of topics further into the study of retail formats and consumption trends.

On the other hand, the scope of regions where international consumer research is targeted was largely confined to industrialized countries prior to the 1980s. Entering into the 1980s and 1990s, the geographical scope covered has been extended to some developing countries, so that more global consumer segments could be identified. However, newly industrialized countries, which possess higher level of purchasing power than other developed countries and in this sense deserve greater marketing efforts, are neglected at large in this wave of extension of geographical reach. This study is a step to fill in this void.

Note

[1]The term 'international' usually involves quite a number of countries (such as 'International Monetary Fund'), and may not be very appropriate for this study covering only two countries. As an alternative, the term 'cross-national' is used in the thesis title. So far most 'international market segmentation' studies have focused on the countries as the unit of analysis. The term 'consumer segmentation', rather than 'market segmentation', is

used in the thesis title so as to stress this study's focus on consumers as the unit of analysis.

[2] Definitions of these five terms are not stated here, because they are not the focus area of the study, and can be found in nearly all marketing textbooks.

[3] Although the overall performance score so calculated contains some subjective element (e.g. is the difference between 'very good' and 'good' the same as that between 'good' and 'moderate'?), it is the best possible rough estimate as such so far.

Chapter 3 – Empirical knowledge underpinnings of the study

The previous Chapter discusses conceptual knowledge in a number of academic disciplines essential to the development of this study. This chapter will discuss empirical knowledge of the two types of objects of analysis in the study – retail formats and consumption trends. Two main focus areas of discussion for each of the two object types are macro-based development and extent of internationalisation, with particular reference to Britain and Taiwan. A grasp of macro-based development gives an outlook of the trend of usage intensity of the object in question from the supplier perspective, which complements the consumer perspective taken for the analysis of this study. Analysing the extent of internationalisation, on the other hand, provides evidence to substantiate the argument for the inclusion of the object being examined in this study.

It is hard to distinguish conceptual from empirical knowledge. Development of conceptual frameworks has to be often supported by empirical work. On the other hand, purely empirical work could be later developed into the building up of some conceptual knowledge. This study distinguishes the two on the basis of the *object* being examined. If the object is conceptual in nature (such as international consumer segmentation), the knowledge built up around it is regarded as conceptual, even though empirical work has been conducted to apply or test the concept. In contrast, if the object is empirical in nature (such as retail formats), it is categorized as empirical knowledge, allowing for conceptual efforts made from within.

3.1 Macro-based development

3.1.1 Retail formats

According to Hortman et al. (1990), different retail formats are 'meaningful differentiated' from each other, and are 'designed to include specific groups of people who shop outlets other than the closest one to their homes by offering and promoting attribute mixes targeted directly at them'[1]. Two implications can be drawn from the definition, which help to streamline the categorization work of this study. First, although no publication so far has treated the Internet as a retail format, the widely acknowledged retail potential that it brings has encouraged companies to design it so as to include specific groups of people who shop here by offering and promoting attribute mixes (such as lower price and convenience) targeted directly at them. In this sense, the Internet can be regarded as a special retail format for the study. Second, Hortman's et al. definition infers that the design of retail formats is consumer-oriented, and the consumer can feel the attribute mixes provided. In other words, categorization of retail stores, based on characteristics like ownership and management that are not readily felt by consumers, such as categorization into multiples, cooperatives and independents in British retailing, is not treated as a spectrum of types of retail formats. On the other hand, consumer-oriented categorization of retail stores, including hypermarkets, superstores, supermarkets and traditional markets, are regarded as retail formats.

The following will firstly discuss the macro-based development of the Internet, as a virtual retail format, and then move on to physical retail formats.

3.1.1.1 Virtual retail format

Ever since the inception of World Wide Web browsers in the early 1990s, the Internet has been increasingly used for marketing. Internet marketing, defined as 'the application of the Internet and related digital technologies to achieve marketing objectives' (Chaffey et. al. 2000), has become a tool for firms to gain access to new markets. There are a number of marketing functions to which the Internet can contribute. For example, the Internet can become a new medium for advertising and public relations, a new way for enhancing customer service, a new channel for distributing products, and a new opportunity for the improvement of marketing effectiveness (Peterson, Balasubramanian and Bronnenberg 1997).

Compared to other Internet marketing functions, Internet retailing[2] or business-to-customer electronic commerce lags in its development. Chaffey et al. (2000) quoting the work of Cavell noted that only 8% of UK companies used the Internet for creating virtual shopping environment and taking online orders. This low figure is partly a reflection of the structure of the retail sector in which a large number of micro-businesses account for a small proportion of sales. Nonetheless e-retailing lags behind other Internet marketing applications, for example the provision of basic marketing information for public relations purposes, display of product catalogues, a point for customer contacts, facilitation of customer feedback, and provision of product information (Peterson, Balasubramanian, and Bronnenberg 1997). Quelch and Klein (1996) suggest this lag is due partly to many companies not proactively developing their web site in integrated support of marketing activities.

The limited development of Internet retailing is present not only for businesses, but also, not unexpectedly, for consumers. Chaffey et al (2000) found that consumers generally spent less time on online shopping than other Internet usage functions. This is the result of less activity rather than more efficient use of time.

Notwithstanding these findings, Internet retailing is still overwhelmingly predicted to prosper and have significant impact on retailer activities (Alba, Lynch, and Weitz 1997; OECD 1998; IMRG 1999; Michalak 1999; Chaffey et. al. 2000; Deloitte Research 2000; Reynolds 2000). Jones and Biasiotto (1998) argued that Internet retailing is still at an early stage of development with a number of factors contributing to potential growth. It is argued by de Kare-Silver (1998) that consumers are compelled by time poverty to continuously search for time saving products or services. He also noted that consumers are reluctant to be 'ruled' by store opening hours or physical locations of the retailers. Rather, they want to buy what they want at any time. Other relevant factors encouraging growth include consumers' demand for greater choice of product, price and information, interactive support from suppliers, and a consumer desire for travel free shopping (Van den Poel and Leunis 1999; Chaffey et. al. 2000).

It is difficult to predict how wide and deep Internet retailing will be. Growth is likely to follow a logistic curve, in similar way to other format innovations, within a diffusion process but the parameters of any development model are presently not forecastable with any confidence. Whether the Internet can successfully challenge physical retail formats and become a major format before 2010 is a great unknown (Dawson 2000). Although there are several studies on the future of Internet retailing, they are not supported by

convincing figures (de Kare-Silver 1998). Nonetheless, such forecasts are useful in providing scenarios of possible development. In this regard, de Kare-Silver (1998) reviewed 38 studies and identified five stages of growth in Internet retailing:

- Stage 1 (1993-1996) is referred to as **initial hype**, in which Internet shopping attracted media attention and aroused high levels of awareness in the society; access was limited and usage was low.
- Stage 2 (1996-1998) labelled as **learning, experimenting, investing** refers to a period companies were considering electronic shopping as a new paradigm for their business.
- Stage 3 (1998-2001) is termed as **new wave of technology and equipment**; in this stage, the Internet reaches into the home through suppliers' efforts with Web TV facilities, digital TV broadcasting, mobile Internet phones, and lower priced PC, but it is still some way from mass consumer acceptance.
- Stage 4 (forecast as 2001-2005) is termed **infrastructure consolidation**; as the name implies, the infrastructure necessary for Internet shopping is rapidly improved and consumer demand grows. These infrastructure improvements include better home delivery operations, extended cable networks, enhanced TV and satellite communication networks.
- Stage 5 (around 2005 onwards) is the final development stage of **mass marketing**; personal computers, televisions and phones with built-in Internet facilities are more user friendly and priced lower. Built-in Internet facilities become part of the package of every new television. Equipment with built-in Internet facilities is in almost every home. Marketing and promotion of facilities for Internet shopping are heated up.

Whilst the model can be criticized as being too focused on the technological infrastructure rather than the consumer use of the value provided by Internet retailing, it is useful in providing a framework to consider the emergence of the new format. The model and dates relate to the UK but provide a general scenario and a coherent development-stage based hypothesis.

Based on the integrated forecast of de Kare-Silver (1998), it may take less than a decade for the Internet to penetrate the mass retail market. Less and less time is required for new electronically based products to penetrate the mass market. Table 3.1 provides support for this view and whilst the exact number of years can be questioned the trend is clear.

Table 3.1 - Time required for electronically based products to penetrate 10% of the mass market

Product	Number of years
Pager	41
Telephone	38
Cable television	25
Fax machine	22
VCR	9
Cellular phone	9
Personal computer	7
CD ROM[1]	6
Wireless data service[1]	6
Screen-phone[1]	6
Interactive television[1]	3

[1] predicted
Source: Coopers & Lybrand (1996a)

Britain and Taiwan form the geographic bases for the study. It is useful therefore to move from the general models to more specific consideration of the two countries. Internet retailing is likely to vary by country. Using the Internet initially is the base on which Internet retailing can build. Therefore, the number of Internet users is taken as an indicator of the prospect for

Internet retailing in a particular country. In this respect, both Britain and Taiwan are in the top fifteen countries ranked on Internet use (Table 3.2), signifying their potential for Internet retailing compared to many other countries.

Table 3.2 - Top 15 countries in terms of the number of Internet users by the end of 2000

Country	Number of Internet Users (in million)	Percentage of 15-country Internet user population
United States	135.7	36.2
Japan	26.9	7.2
Germany	19.1	5.1
UK	17.9	4.8
China	15.8	4.2
Canada	15.2	4.1
South Korea	14.8	3.9
Italy	11.6	3.1
Brazil	10.1	2.8
France	9.0	2.4
Australia	8.1	2.2
Russia	6.6	1.8
Taiwan	6.5	1.7
Netherlands	5.4	1.5
Spain	5.2	1.4

Source: Cyberatlas (2000)

In Britain, almost 1.3 million people had made online purchase as of the second half of 1998 (Reed 1999). However, their online expenditure in total made up only 0.2% of retail sales in the country. A study by Enos (2000) undertaken in 1999 showed that although 26% of British adults use the Internet, only 3% do regular online shopping. The Taylor Nelson Sofres (2000) with a survey date of April 2000 shows 27% of British adults use the Internet of which 18% have used it for shopping online and a further 8% have used it to collect information that was then used in off-line shopping. Kavanagh (1999) states that online purchase remains a minority interest among UK Internet shoppers. People are enthusiastic about the technology,

but are cautious about using it as a retail format. One of their concerns is the security problem of transactions over the Internet.

Although the Internet occupies only a tiny share of the retail market in the UK, growth is widely believed to be imminent (Enos 2000). British shoppers report a number of benefits that the Internet can bring. Not having to travel is the greatest of them. Other cited benefits include speed and ease of shopping online, delivery service, comparison shopping, and no pressure from sales people. Fuelled further by wireless devices and interactive TV, total online sales in the UK are predicted to account for 7.5% of total retail sales by 2005, which represents a substantial increase over a 0.2% share in late 1998 (Enos 2000). By 2000, online sales in some sectors (computer software and books) have already occupied more than 5% of respective sector retail sales. Yet on an absolute value basis, the grocery sector is the largest sector (Table 3.3). The online grocery business in the UK is also successful when compared to that of other countries. Finch (2001) reported that British shoppers are using the Internet for their weekly food and grocery shopping more than consumers in any other country, including the US where the online shopping concept was pioneered. Tesco.com is the world's biggest online grocery retailer.

Table 3.3 – Turnover and market share of online sales by sector in the UK

Sector	Turnover (£million)	Market share
Grocery	165	0.2
Computer software	122	10.0
Books	106	5.2
Music and video	85	2.9
Electrical goods	18	0.2
Clothing and footwear	5	0.1
Healthy and beauty	1	0.0
Others	79	0.2

Source: Verdict (2000)

In Taiwan, there is also a considerable scope for growth of Internet retailing. Again shopping is less common than other Internet usage functions, for example browsing, searching for information, communication, downloading software, watching news, job search, online learning, chatting, making friends, and playing games. The extent to which a person uses the Internet for shopping is positively related to the extent it is used for other purposes. As more than 70% of Internet users have more than one year of Internet usage experience, it is predicted that Internet retailing is likely to increase in Taiwan (FIND 2000). Peng (2000), referring to a study by Information Development Institute, has already indicated a high growth compared to previous years. The Taylor Nelson Sofres (2000) survey of April 2000 indicated that 35% of adults were Internet users but only 4% of these were on-line shoppers with a further 25% having tried but dropped out of shopping process for some reason and a further 18% expecting to become on-line shoppers. Such figures suggest potential growth if the service provision is improved. Cheung (2000) forecasted Taiwan's electronic commerce (including business-to-business and business-to-consumer electronic commerce) revenue to increase from US$2.3 million in 2000 to US$20.7 million in 2004. In view of such a bright prospect, more than 90% of large general merchandise retailers have set up e-commerce facilities (Ho 2000).

3.1.1.2 Physical retail formats

Different societies design different classification systems of their physical retail formats. In Britain, grocery retailers are categorized into three types – multiples, cooperatives, and independents. Such a categorization is based on ownership and management, rather than on attribute mixes targeted at and felt by consumers. Although The Institute of Grocery Distribution (IGD)

makes a more detailed classification of grocery retailers - multiples, cooperatives, discount stores, convenience retailing, and independents (Shone 1994a, 1994b, 1994c; Annette et al. 1998; Mitchell-Fox 1999a, 1999b, 1999c, 1999d) – it is clearly a mix of two standards of categorization, i.e. categorization by ownership/management and categorization by attribute mixes.

Fortunately, IGD provides sub-categorization of multiples, cooperatives and independents by sales area. This helps to approximate a picture of the macro-based development of hypermarkets, superstores, and supermarkets in Britain.

In Taiwan, the official retail classification system is more in line with categorization by attribute mixes – general merchandise store (similar to hypermarket and superstore in Britain), supermarket, convenience store, and traditional grocery store. However, statistics related to the traditional market, a major player in Taiwanese retailing, is collected on an ad-hoc basis only.

Besides the classification systems, the definitions of the same retail formats are also likely to be different between countries. Table 3.4 outlines the definitions, in terms of selling space, of the hypermarket, the superstore, and the supermarket in Britain and Taiwan respectively.

Table 3.4 – Selling space definitions of the hypermarket, the superstore, and the supermarket in Britain and Taiwan[1]

Retail format	Britain	Taiwan
Hypermarket	>50,000 square feet in selling space	Hypermarket and superstore formats in aggregate called general merchandise store >33,000 square feet (1,000 pings[2])
Superstore	>=25,000 square feet in selling space	
Supermarket	<25,000 square feet in selling space[3]	>2,310 square feet (70 pings) in selling space
Edge/out-of-town supermarket	Usually larger than town centre/high street supermarket	Supermarket in Taiwan seldom at the edge or out of town
In-town supermarket	Referred to town centre/high street supermarket	Comprising purpose-built supermarket and department store supermarket

[1] The Internet uses the same operating standard around the globe, and it is therefore considered superfluous to discuss the definitions of the Internet between countries. There are no academic or industry definitions, particularly in terms of selling space, of the traditional market in Britain and Taiwan.

[2] A common area measure in Taiwan, with 1 ping approximately equals to 3.3 square feet

[3] The lowest selling space limit has been variously defined, including 5,000 square feet and 10,000 square feet (Guy 1994)

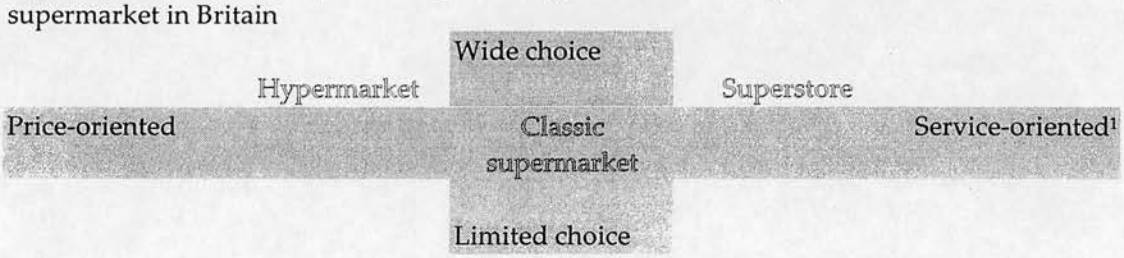
Sources: Guy (1994); Healey & Baker (1999); Liao (2000a); Liao (2000b)

As shown in Table 3.4, there are wide discrepancies in selling space definitions of the same retail format type between the two countries. However, the smaller space in every Taiwanese retail format is probably only a partial reflection of the smaller geographical size of Taiwan compared to Britain. The next chapter will demonstrate that each of the same retail format type in Table 3.4, albeit differently defined in selling space, is functionally equivalent between the two countries.

There are some definitions and descriptions, other than selling space, which apply to different retail formats listed in Table 3.4. In Britain, a hypermarket offers a wide range of food and non-food merchandise (Guy 1994), and is

very price-oriented. A superstore focuses predominantly on food (Davies 1995), and generally has a congruent pricing policy. Compared to hypermarkets and superstores, supermarkets provide a narrower range of merchandise (Figure 3.1). Both hypermarkets and superstores are situated farther from the city centre. Yet there are greater variations in location for supermarkets. Supermarkets are dichotomised into edge/out-of-town supermarkets and in-town supermarkets (Healey & Baker 1999). The former is usually larger in size than the latter. In 1997, 78% of multiples operating in edge/out of town have a selling space of more than 25,000 square feet, which meet the selling space requirement of a superstore, and only 5% have a selling space of less than 10,000 square feet (Annette et al. 1998). As edge/out-of-town supermarkets are more alike in selling space and location to hypermarkets/superstores than their town-centre/high-street counterparts, it is considered more appropriate to group edge/out-of-town supermarkets into the hypermarket/superstore format in this study.

Figure 3.1 – Comparative positioning of the hypermarket, the superstore, and the supermarket in Britain



[1] This study is inclined to disagree to the highly service-oriented positioning of the superstore.
Source: Tordjman (1995)

In Taiwan, general merchandise stores, although variously described (Table 3.5) and lacking a uniform definition, are the closest approximation to hypermarkets/superstores in Britain. Both of them are the largest single-fascia retail formats, offer a very wide selection of merchandise, and compete

at low price. They are therefore paired[3] in this study, and further support for the equivalence between the two will be provided in the next chapter.

Table 3.5 – Description of general merchandise store in Taiwan

	Liu (1994)	Kao (1995)	Liao (2000a)
Product variety	10 thousand – 30 thousand	A wide range of food and non-food merchandise	More than 10 thousand
Operating characteristics	Mostly erected at edge/out-of-town industrial district Catchment area 3 – 20 kilometres	Mostly erected at edge or out of town Ample car parking space	Ample car parking space

Supermarkets in Taiwan are of two types: purpose-built supermarkets and department store supermarkets, such as in Mitsukoshi, Sogo, and Far East department store. These supermarkets are usually conveniently located somewhere in the city or town, and take fresh food as one of its major sales categories (Kao 1995).

As noted above, multiples/cooperatives/independents are not regarded as retail formats defined in this study. However, a brief account of them is considered beneficial because they can be used to draw up a picture of the macro-based development of hypermarkets, superstores and supermarkets in Britain.

Table 3.6 indicates that the number of multiples has been increasing by just over 30% during the period from 1980 to 1998. In contrast, the number of both cooperatives and independents experienced continual decline of 54.7% and 47.2% over the same period. This partly reflects an increase in market share of multiples at the expense of the other two retail ownership/management groups (Table 3.7). In terms of percentage of

number of outlets, more multiples than cooperatives or independents are of a sales area exceeding 25,000 square feet. Table 3.8 shows that while 31.1% of multiples with a sales area at or above 3,000 square feet are superstores/hypermarkets, only 7.0% and 13.6% of cooperatives and independents respectively falling into the same range of sales area are of such retail formats. Table 3.9 fills the missing gap in Table 3.8, by showing that while only 21.8% of multiples are below 3,000 square feet of sales area, 54.5% and at least 74.9% of cooperatives and independents are of the same phenomenon. Note that although data from Table 3.8 and Table 3.9 respectively are two years apart, they are considered acceptable to be analysed together because there has not been any significant structural change in grocery retailing over this period. The analyses above, in aggregate, imply the growth of the hypermarket/superstore format over the last twenty years in Britain, which is evidenced in Table 3.10.

Table 3.6 - Number of outlets[1] of different grocery retail ownership/management groups in Britain

Year	Multiple	Cooperative	Independent	Total
1980	4,994	4,919	51,494	62,333
1985	4,483	3,131	47,068	54,682
1988	4,251	2,704	42,941	49,896
1989	4,296	2,614	42,941	49,851
1990	4,439	2,545	41,223	48,207
1991	4,577	2,481	32,663	39,721
1992	4,757	2,395	32,663	39,815
1993	5,591[2]	2,324	31,602	39,517
1994	5,593	2,324	31,602	39,519
1995	5,667	2,362	31,382	39,411
1996	5,826	2,316	28,840	36,982
1997	6,349	2,263	28,319	36,931
1998	6,530	2,227	27,170	35,927

[1] Figures based on census taken 1 January of each year

[2] A sharp increase is mainly a result of inclusion of Iceland stores for the first time

Source: Annette et al. (1998) for the period from 1980-1997; Mintel (1999) for 1998

Table 3.7 - Market share by value of different grocery retail ownership/management groups in Britain

Year	Multiple	Cooperative	Independent
1982	64.7	13.1	22.2
1985	70.1	11.6	18.3
1986	71.8	11.1	17.1
1987	72.9	10.9	16.1
1988	73.9	10.9	15.2
1989	74.2	10.8	15.0
1990	75.8	10.3	13.9
1991	77.8	10.4	11.8
1992	79.4	9.5	11.1
1993	81.6	8.8	9.6
1994	81.4	8.7	9.9
1995	81.7	8.6	9.7
1996	83.6	8.0	8.4
1997	85.6	7.0	7.4

Source: Annette et al. (1998)

Table 3.8 - Number of grocery retail outlets[1] by sales area[1]/retail ownership/management group for the year of 1999 in Britain

Sales area (square feet)	Multiple	Cooperative	Independent	Total
3,000-10,000	1,199	711	21	1,931
10,000-25,000	1,126	232	17	1,375
25,000-34,999	518	43	3	564
35,000-44,999	378	16	1	395
45,000-54,999	106	4	0	110
55,000-64,999	27	4	1	32
65,000-74,999	8	3	1	12
75,000-84,999	4	0	0	4
85,000-94,999	5	0	0	5
95,000+	4	1	0	5
Total	3,375	1,014	44	4,433

[1] Only retail outlets with a sales area exceeding 3,000 square feet are included
Source: Mitchell-Fox (1999a, 1999b, 1999c, 1999d)

Table 3.9 - Breakdown by sales area of different grocery retail ownership/management groups for the year of 1997 in Britain[1]

Sales area (square feet)	Multiple	Cooperative	Independent
Under 500			27.3
500-1000			36.0
1000-1500			7.6
1500-2500			2.7
2500-3000			0.5
>3000			0.8
Under 3000	21.8	54.5	
3000-9999	32.2	31.8	
10000-24999	21.8	10.4	
25000-39999	17.6	2.5	
>40000	6.6	0.8	
Unknown	0.0	0.0	25.1
Total	100.0	100.0	100.0

[1] Empty cells represent data not applicable
Source: Annette et al. (1998)

Table 3.10 - Number of outlets of different grocery retail formats in Britain[1]

Year	Internet	Hypermarket	Superstore	Hypermarket/ superstore	Supermarket	Traditional market
1957					118	
1965				4		
1966					2,669	
1967		1				
1968			1			>500[2]
1970				19		
1971						788[3]
1980			138	239		
1984						
1985		40		403		
1988						
1989						
1990				644		
1991				733		
1992				835		
1993				862		
1994				990		
1995				1,017		
1996				1,052		
1997				1,067		
1998				1,125[4]		
1999		58~168	959~1,069	1,127	3,306[5]	

[1] Empty cells represent data not available; [2] Excluding Scotland, where the proportion of towns with retail markets was significantly lower than in England and Wales (Scott, 1973); the figure is using Scott (1973)'s estimation that 'about 450 of the towns ... together with London boroughs, had at least

one retail market in 1968, though many had several. In addition about fifty markets were located in villages and other smaller centres'; [3] Covering the whole of Britain. The 788 traditional markets comprised 86,612 stalls operated by 57,276 traders. Yet considering that the same trader may trade in different markets on different days, the figure of 57,276 traders relates to the amount of trading rather than the number of different people who are traders (Kirk, Ellis and Medland 1972); [4] Large increase is due to expansion of British multiples into Northern Ireland, and the inclusion of a number of Northern Ireland's stores for the first time; [5] Annette et al. (1998) define a supermarket as 'a self-service grocery store of between 3,000 and 10,000 square feet sales area' and a large store as 'a grocery store of between 10,001 and 24,999 square feet sales area'. The term 'a large store', which is neither a supermarket nor a superstore, seems ambiguous. For the purpose of clarity, this study takes any grocery store occupying a sales area of between 3,000 and 24,999 square feet as a supermarket. One major reason for setting a minimum limit of 3,000 square feet sales area is that any shop occupying a sales area of more than 3,000 square feet can open only 6 hours on Sundays, and since long operating hours are an integral feature of a convenience store, shops with a sales area above 3,000 square feet should be more accurately called supermarkets, rather than convenience stores.
Source: Kirk, Ellis and Medland (1972); Scott (1973); Alexander (1995); Annette et al. (1998); Mitchell-Fox (1999a, 1999b, 1999c, 1999d)

The faster growth of the hypermarket/superstore vis-à-vis the supermarket has also been found in Taiwan. During the decade of 1990s, the number of hypermarkets/superstores increased more than four folds, while that of supermarkets rose by less than two folds (Table 3.11). Viewed from another perspective, over the five-year period of 1994-1999, sales growth of the superstore was 156%, but sales in supermarkets grew by only 48% (Table 3.12). Shiu and Dawson (2002) posited that the faster expansion of the hypermarket/superstore system cannot be attributed to the trading up of its major competitor, the supermarket, which has not driven up expenses and prices. It is the slower economic growth in the early 1990s that contributed greatly to the high growth of the hypermarket/superstore (First Commercial Bank 1996). On the other hand, Shiu and Dawson (2002) gathered additional information particularly about the convenience store, and came to the conclusion that the faster growth of the hypermarket/superstore compared to the supermarket seems to be accounted for by the polarization principle, which contends that the trend towards fewer but large retail formats is

counterbalanced by a renaissance of the small shop sector (Dreesman 1968). The hypermarket/superstore, which is basically a search for economies of scale at establishment level, has expanded its market share in Taiwan. This is met by the contemporary rapid development of small convenience stores, which provide essential emergency and 'top up' facilities for one-stop shoppers. At the opposite ends of the scale spectrum, they have been the two most flourishing grocery retail formats in recent years. Supermarkets, situated in between, seem to be challenged by the polarization principle.

Table 3.11 also shows that the number of traditional markets is still gradually increasing, from 591 in 1995 to 631 in 1999. Liao (2000c) identified six reasons for the attractiveness of the traditional market. These are close seller-buyer relationships, convenient location, wide variety of products, opportunity for bargaining, freshness based on on-the-spot slaughtering, and flexibility in the number of units of purchase.

Table 3.11 - Number of outlets of different grocery retail formats in Taiwan[1]

Year	Internet	Hypermarket/ superstore	Supermarket[2]	Traditional market
1988				
1989				
1990				
1991			364	
1992		20	454	
1993		26	545	
1994		31	638	
1995		42	659	591
1996		55	852	
1997		64	846	
1998	300	92	883	
1999		109		631[3]
2000[4]		109	907	

[1] Empty cells represent data not available

[2] The figures are derived from two sources. The number of supermarkets each year from 1991 to 1995 represents one source, while that from 1996 to 2000 represents another source. The main difference is that the latter source includes companies that were cooperatives but are now classified as supermarkets. Therefore, figures cannot be compared across the two sources.

[3] There are altogether 51,202 stalls in the 631 traditional markets in 1999.

[4] Number of supermarkets as of August 2000

Source: Directorate-General of Budget, Accounting and Statistics (1996); Ministry of Finance (1996); Supermarket Association of Republic of China (1996); Taipei Market Administration Department (1996); Distribution News Group (1999); Liao (2000c); Liao (2000d); Retail Market Group (2000)

Table 3.12 – Sales revenue of different grocery retail formats in Taiwan[1]

Unit: NT$ million[2]

Year	Internet	Hypermarket/ superstore	Supermarket	Traditional market
1994		50,472	51,098	
1995		65,460	55,604	
1996		77,497	61,423	
1997		89,830	66,270	
1998		108,198	72,236	
1999		129,336	75,719	103,000

[1] Empty cells represent data not available

[2] US$1=NT$29.5 over the years 1994-1999 on average

Source: Ministry of Economic Affairs (2000); Ministry of Finance (2000)

Two indexes – person index (average number of persons per outlet) and land index (average number of outlets per thousand square kilometers of land) –

are created to proxy and compare the development of different retail formats between Britain and Taiwan. Table 3.13 shows that a typical hypermarket/superstore potentially serves a much larger customer base – nearly 4 to 1 - in Taiwan than in Britain. This should have been one major reason why recently Tesco has been aggressively establishing their strongholds in Taiwan. However, such a difference is rapidly diminishing over the last decade, from more than 14 to 1 in 1991 to less than 4 to 1 in 1999.

In the case of supermarket, the potential customer base in Taiwan is only 1.4 times greater than that in Britain.

In terms of the land index, there are 4.7 hypermarkets/superstores per thousand square kilometers in Britain, and 3.01 in Taiwan (Table 3.14). So the land index difference is much smaller than the person index difference between the two countries. This reflects higher population density in Taiwan.

The land index difference runs the opposite for the supermarket. There are more supermarkets per thousand square kilometers – at nearly 2 to 1 - in Taiwan than in Britain. The supermarket, which is much smaller in size than the hypermarket/superstore, may be, other things being equal, evolutionarily more adept to a smaller country of high population density than a larger country of lower population density.

A within-country comparison shows that the supermarket is at a higher saturation point – in terms of lower average number of persons per outlet and higher average number of outlets per thousand square kilometers of land - than the other two retail formats for both Britain and Taiwan. The

hypermarket/superstore is ranked second, and the traditional market comes third in Britain. Yet in Taiwan, the traditional market is more saturated – in terms of the two above-mentioned indexes – than the hypermarket/superstore.

Table 3.13 – Average number of persons per outlet for different physical retail formats in British and Taiwanese grocery markets[1]

Year	Britain			Taiwan		
	Hypermarket /superstore	Supermarket	Traditional market	Hypermarket /superstore	Supermarket	Traditional market
1981						
1982						
1983						
1984						
1985	140,677					
1986						
1987						
1988						
1989						
1990	89,390					
1991	78,873				56,610	
1992	69,477			1,040,150	45,822	
1993	67,515			807,500	38,523	
1994	58,991			683,161	33,194	
1995	57,632			508,500	32,408	36,137
1996	55,900			391,364	25,264	
1997	55,308			339,734	25,701	
1998	52,655			238,359	24,835	
1999	52,796	17,998		202,679		35,011
2000				204,376	24,561	

[1] Empty cells represent data not available

Source: Table 3.9; Table 3.12; population figures in Britain and Taiwan

Table 3.14 – Average number of outlets per thousand square kilometers of land for different physical retail formats in British and Taiwanese grocery markets[1]

Year	Britain			Taiwan		
	Hypermarket /superstore	Supermarket	Traditional market	Hypermarket /superstore	Supermarket	Traditional market
1981						
1982						
1983						
1984						
1985	1.68					
1986						
1987						
1988						
1989						
1990	2.68					
1991	3.05				10.06	
1992	3.48			0.55	12.55	
1993	3.59			0.72	15.06	
1994	4.13			0.86	17.63	
1995	4.24			1.16	18.21	16.33
1996	4.38			1.52	23.54	
1997	4.45			1.77	23.38	
1998	4.69			2.54	24.40	
1999	4.70	13.78		3.01		17.44
2000				3.01	25.06	

[1] Empty cells represent data not available

Source: Table 3.9; Table 3.12; land area figures in Britain and Taiwan

3.1.2 Consumption trends

Market evidence shows that across cultures and countries, more and more people are in pursuit of the convenience and health trends.

For example, the Internet is a typical product that grows in rhythm with the convenience trend. Consumers who value convenience tend to engage in online shopping frequently and they tend to incur higher expenditure on electronic transactions. The motivation for convenience is even greater for people with higher levels of education and income (Swaminathan, Lepkowska-White and Rao 1999), which an increasing number of citizens in advanced and newly industrialized countries can enjoy. The positive relationship between the importance placed on convenience and the

frequency of online shopping has also been found in Li, Kuo and Russell (1999).

On the other hand, the health trend has spawned an increasing number of health resorts, which design a programme of health-enhancing activities over a period of typically seven days for holidaymakers. These activities include, among others, practice of natural life, practice of simple life, no eating, healing large intestine by water, use of natural herb, functional eating, herb steaming, Yoga, Spa massage, Indian preventive healing, quiet sitting without any thinking, psychological healing, and magnetic field of body energy. Prior to 1998, there were only about ten such health resorts all over the world, but now the number has increased a lot, with Thailand alone having several. The Ubud Sari Health Resort in Indonesia is one of the most popular (Liu 2000). Recently, Tesco has launched Tesco healthy living club to take advantage of the health trend in the UK. Members of the Club get tailor-made health information, expert advice, money-off coupons and health product offers (Tesco 2002).

These twin trends of convenience and health have also been noted in both British and Taiwanese food markets (Ritson and Hutchins 1991; Lee 1998).

3.1.2.1 Convenience trend

Ritson and Hutchins (1991) chose 155 foods or food groups that come from the product list of National Food Survey, drew up a linear trend for each of them, and ranked them in terms of the annual percentage of change in underlying demand. Underlying demand is a reflection of consumers' real preference, because it is measured on the condition that the price of the product in question and the income of consumers have remained constant.

Five of the ten products having the greatest increase in underlying demand are more or less linked to convenience orientation (Table 3.15).

Table 3.15 - The five convenience-oriented food products in Britain

Product	Annual change in demand (%)	Orientation
Frozen chips and other frozen convenience potato products	+13	Convenient
Frozen convenience cereal foods (e.g. pastries and pizzas)	+11	Convenient
Other vegetable products (including prepared salads)	+9	Convenient
Fruit juices	+8	Convenient and healthy
Crisps and other potato products, not frozen	+7	Convenient

On the other hand, six of the ten food products having the smallest increase or greatest decrease in underlying demand over the years arguably indicate a trend away from less convenient food intake (Table 3.16). For instance, unfilleted fish, fresh peas, offals and brussels sprouts usually take longer preparation and eating times (Hutchins and Dawson 1998). Soft fresh fruit, including mainly blackberries, raspberries and strawberries, is often used as an ingredient for products like fruit pie. In this sense, it is treated as less convenient food.

Table 3.16 - The six convenience-averse food products in Britain

Product	Annual change in demand (%)	Orientation
Fresh white fish, unfilleted	-22	Less convenient
Fresh peas	-16	Less convenient
Processed fat fish, unfilleted	-15	Less convenient
Soft fresh fruit, other than grapes	-15	Less convenient
Offals, other than liver	-9	Less convenient and healthy
Brussels sprouts	-7	Less convenient

Besides National Food Survey, Eurofood (1999) noted that, over the years from 1995 to 1999, sales of ready meals in the UK increased from £892 million to £1,061.8 million, representing an increase of 15%. World of Ingredients (1998), referring to Cyril Freedman, chairman of Board of Directors of S.

Daniels plc in the UK, reported that the growth rate of ready-to-eat food products is nearly two times of that of all foods on average. Food Trade Review (1998) noted that the production value of instant chilled meal in Britain grew by 23% in 1998, and would grow further. World of Ingredients (1999), referring to a report by Foodservice Intelligence, forecasted that expenditure on eating away from home will be greater than expenditure on eating at home in Britain by 2020.

One driving force of an increasing demand for convenience-oriented food products in Britain is the proliferation of working women, who seek easy-to-prepare and quick-to-cook foods (Ritson and Hutchins 1991). Coopers & Lybrand (1996b) quoting the survey of Henley Centre reported that 86% of UK women never have enough time to 'get things done', and 44% of UK workers arrive home exhausted. The popularity of these foods was also demonstrated by Gofton and Marshall (1989). They conducted a food diary survey on the meal patterns among Newcastle households. Results showed that the preparation time of around 94% of meals took less than 10 minutes, and 51% even did not require any preparation time. In another vein, approximately 61% of meals did not need any cooking, and only 7% required more than 20 minutes for cooking purposes (from around 94% to more exact figure; checking needed).

Another driving force was the deskilling trend associated with preparing and cooking meals (Hutchins and Dawson 1998). A number of factors contribute to it. Time pressures and changing work patterns result in fewer formal meals being prepared. Fewer parents have the time or knowledge to pass on such skills to their children. As the skill base falls, the demand for food and meals that require little or no preparation increases. This in itself

discourages consumers from acquiring cooking skills, and so a downward and irreversible spiral of diminishing cooking skills is formed.

Other driving forces include the increase in the number of single-adult households that is partly caused by the increase in divorce rate, from 0.9% in 1971 to 5.1% in 1991 (Central Statistical Office 1996). This results in the decrease in average household size from 3.1 in 1961 to 2.4 in 1994 (Central Statistical Office 1996), which contributes to a change in meal patterns towards lighter meals (Ritson and Hutchins 1995). Hutchins and Dawson (1998) noted that the proportion of single person households has increased more than any other types, almost doubling since 1961 from 14% to 27% in 1997. They also noted that households of smaller size are generally less likely to spend time preparing foods.

In the case of Taiwan, during the years from 1984 to 1996, expenditure on processed foods as a percentage of total food expenditure in Taipei city increased from 23% to 28%. This reflected a pursuit of convenience in food eating (Lee 1998), and was caused by a number of environmental changes, notably an upward movement of disposable income and a rising number of working women. As recorded by Directorate-General of Budget, Accounting and Statistics (2000), from 1992 to 1998, the number of men in employment increased by 4.3%, while the number of women in employment grew by 15.7%. These environmental changes contribute to an increase in opportunity cost of time spent on food preparation. People were willing to pay a higher price for processed foods that are easier and less time consuming to prepare.

The trend toward less time-consuming eating is more evident if taking a longer time horizon. Throughout the twenty-five year period from 1973 to 1998, meat products as a proportion of total meat expenditure increased from 8.9% to 13.7%. Fruit products as a proportion of total fruit expenditure rose from 2.2% to 7.2% (Table 3.17).

Table 3.17 – Expenditure on meat and fruit in Taipei city

Unit: NT$[1]

Year	Meat			Fruit		
	Processed	Unprocessed	Total	Processed	Unprocessed	Total
1973	766.6	74.6	841.2	197.9	4.5	202.4
1998	1684.2	267.8	1952.0	1522.5	118.4	1640.9

[1] NT$ = New Taiwanese dollar; conversion to British pounds is not shown, because the expenditure data are used only to show the trends within Taiwan

From mid 1980s to mid 1990s, Gross National Product per capita in Taiwan rose from around US$6,000 to more than US$10,000, the average household size fell below 4, the divorce rate jumped from less than 1% to nearly 2%, the percentage of elderly people from less than 5% to more than 7%, and the number of working women from less than 3 million to more than 3.5 million. All these contributed to a rising relative cost of time spent on food preparation.

3.1.2.2 Health trend

Ritson and Hutchins (1991) found that, in Britain, six of the ten products (out of 155 products listed in National Food Survey) having the greatest increase in underlying demand are generally related to health orientation (Table 3.18).

Table 3.18 - The six health-oriented food products in Britain

Product	Annual change in demand (%)	Orientation
Other fresh green vegetables (e.g. spinach, broccoli)	+29	Healthy
Wholemeal and wholemeal bread	+18	Healthy
All other fats (e.g. low fat spreads)	+12	Healthy
Fruit juices	+8	Convenient and healthy
Other fresh fruit (e.g. melons, pineapples and exotics)	+7	Healthy
Shellfish	+6	Healthy

On the other hand, five of the ten food products having the greatest decline in underlying demand are less healthy (Table 3.19). Among them, canned, bottled and instant fruits and vegetables are connected with artificial preservation (Hutchins and Dawson 1998).

Table 3.19 - The five health-averse food products in Britain

Product	Annual change in demand (%)	Orientation
Instant potato	-10	Less healthy
Offals, other than liver	-9	Less convenient and healthy
Baby foods, canned and bottled	-8	Less healthy
Canned and bottled fruit	-8	Less healthy
Canned potatoes	-7	Less healthy

In Taiwan, Lee (1998) used the ten years (1984-1993) time series data of the Survey on Family Income and Expenditure. He found that, during this period, expenditures on rice, meats, eggs, oils and flavouring, expressed as a percentage of total expenditure spent on food at home, were decreasing. In the meantime, there were significant increases in the percentage of expenditures on flour and fish. He argued that such changes in the composition of at-home food expenditure 'are likely to reflect consumer concern about the effects of fat and cholesterol, and the health risk associated with the consumption of meat'. On the contrary, food products that are generally regarded as contributing to health, such as fish, fruits and dairy

products, increased their weights in total at-home food expenditure (Table 3.20).

Table 3.20 – Per capita annual at-home expenditures by food categories in Taiwan

Category	1984		1993	
	NT dollars[1]	Percentage	NT dollars[1]	Percentage
Staple foods	2,864	16.25	3,556	13.96
Rice	1,939	11.00	1,834	7.20
Flour	730	4.14	1,400	5.50
Other cereals	195	1.11	322	1.26
Supplementary food	10,937	62.05	15,108	59.29
Meats	3,931	22.30	4,951	19.43
Fish	3,116	17.68	4,951	19.43
Vegetables	2,650	15.03	3,965	15.56
Eggs	461	2.62	420	1.65
Oils	481	2.73	482	1.89
Flavourings	298	1.69	339	1.33
Fruits	2,371	13.45	4,177	16.39
Dairy products	826	4.68	1,347	5.29
Others	628	3.56	1,293	5.07
Total	17,626	100.00	25,480	100.00

[1] NT$ = New Taiwanese dollar; conversion to British pounds is not shown, because the expenditure data are used only to show the trends within Taiwan
Source: Lee (1998)

A few success stories of health-oriented food products provide further evidence of the trend in Taiwan. Olive oil, being one of the healthiest oil, is the highest growth oil. In 1999, the market of olive oil grew by 180% (Central Daily News 1999). Drinking yoghurt, which contains the bacteria that are good for body health, grew by more than 30% in sales over the previous year (Economic Daily News 1998a). Low calorie chewing gum also experienced high market growth (United Daily News 1998b).

The growth of health-oriented food products is attributed to a multitude of factors: deteriorating environment, ageing population, increasing number of diseases, greater health consciousness of consumers, rising living standard, prolonged life expectancy, and escalating amount of health information

(Biotechnology and medicine newspaper 1998; Economic Daily News 1998b). United Daily News (1998a), referring to Chou You-Xian, managing director of Rui-Xin Company (one of the biggest direct selling companies in Taiwan), noted a strong demand for foods that can delay ageing effects, strengthen the immune system and prevent from cancer.

3.2 Extent of internationalization

In assessing the extent of internationalization of an object (product, service or idea), it is necessary to trace both its origin and its trait of internationalization. By tracing the origin, the cultural influence, which should hinder the smoothness of internationalization, of the object being studied, can be identified. By tracing the trait of internationalization, either actual or expected, of an object, one can determine if and to what extent the object is internationalized on a macro basis.

The origin and the trait of internationalization are related to each other. In the case of retail formats, the origin of some of them is heavily embedded with the deeper side of a country's history, such as culture, politics and religion, which hinders their internationalization. On the contrary, the origin of some others is less interwoven with the deeper side of a country's history and more in line with the economic development. These retail formats are probably more susceptive to be internationalized[4], which takes one of two forms (Goldman 2001). First, the retail format may be internationalized without any change. Second, it may embody extensive revisions whilst being internationalized into other countries. Salmon and Tordjman (1989) labeled retailers adopting the first form as 'global', and those using the second form as 'multi-national'. Retail format revisions, if required, usually reflect the uniqueness of the society to which the retail format is transferred.

The revisions usually accrue to the peripheral part, rather than the core part, which represents key elements that should not be changed, of the retail format (Goldman 2001). Examples of retail format revisions can be found in Carrefour's individual hypermarket operations in Spain, Portugal, Argentina, Brazil, Taiwan and the US (Dawson 1994). This study acknowledges retail environment differences between countries, and therefore will analyze retail format internationalization without differentiating the 'global' form from the 'multi-national' form.

3.2.1 Retail formats

3.2.1.1 Virtual retail format

World Wide Web (WWW) browsers and servers were first addressed by Tim Berners-Lee in 1989, and the first browser was made available to the High Energy Physics Community. By the beginning of 1993, there were 50 known WWW servers worldwide. In that year, the National Centre for Supercomputing Applications released the Mosaic browser for Unix systems. The browser was made up of six elements, i.e. title field, Uniform Resource Locator (URL) field, NCSA Mosaic globe, document view area, status line, and bottom control panel. The release is a key stage for the propounding explosive growth of the Internet all over the world, as the release of the Mosaic browser represents simple and free access to files, systems, people, mail, gopher, ftp, and news. By the end of 1993, there were over 500 known WWW servers.

In 1994, the first commercial browser, Netscape, was formed. This helped to dramatically increase Web traffic. By the end of 1994, the number of servers worldwide grew to 10 thousands, and 10 million people used the Internet (Lloyd 2001).

The Internet has been much often categorised as an internationalised product or idea. It is perceived as 'captivating people on every continent in virtually every culture, and in many languages' (Stores 2000). Graham (1996) claimed that internationalisation is one striking feature of the Internet. Even in poorer countries, people are getting online in huge numbers. For instance, in India, the number of Internet users had already exceeded one million in 1996. Graham believed that Internet access transcends national boundaries, as anyone anywhere can communicate and shop with others anywhere else. In a similar vein, Hamel and Sampler (1998) declared the beginning of 'a world where customers are no longer hostages to geography'. Hamill (1997) also noted that the Internet 'provides a low cost gateway to global markets for small and medium-size enterprises', although caution has to be spelt out that mere Internet presence does not automatically lead to globalization success, as the online retailer has to play appropriate roles in cyberspace, adopt sound marketing strategies and business practices, and act locally where appropriate. Miller (1995), quoting the work of an advertising agency DMB&B that looked into consumption behaviour of more than 6500 teenagers in 26 countries, noted that teenagers across countries lead similar lives in many aspects, among which surfing the Internet is one of them. Recently, Ernst and Young (2001) found that, in most of the countries surveyed, more than a half of companies that were in the sample generate international sales via their online stores, and 58% of all consumers surveyed outside the US have bought from an online company located in a foreign country (Table 3.21).

Table 3.21 – Companies generating international sales via online stores and consumers making online purchase from a foreign company

Country	Percentage of companies in sample	Percentage of consumers in sample
US	43	12
Non-US[1]		58
Australia	100	65
Brazil	75	45
Canada	33	72
France	67	53
Germany	67	42
Israel	67	75
Netherlands	67	72
South Africa	67	58
Spain	67	46
Switzerland	25	72
UK	42	50

[1] Empty cells represent not available
Source: Ernst and Young (2001)

3.2.1.2 Physical retail formats

Modern retail formats mostly originated or first achieved rapid development in the US, and then spread to other parts of the world. As noted by Stacey and Wilson (1958), most of the innovations in British retailing have been pioneered by the American counterparts. This had been triggered by the economic problems of mass production without mass distribution during the inter-war years in the US. A more underlying factor is about the culture – as a giant New World country, the US was much less hampered by retailing tradition and more encouraged by the desire for change and innovation than countries in the old continents (Zimmerman, 1955; Stacey and Wilson, 1958). Consequently, US retailing experimented more and developed further than any other country. The supermarket, mail order and voluntary group purchasing arrangements are some typical cases of retailing innovations that have been consolidated in the US and emulated in many parts of the world.

Hypermarket/superstore The idea of edge/out-of-town large retail store, which is an earlier version of the hypermarket/superstore, traces to the US of the 1930s. Plagued by the Great Depression, a number of manufacturers came together and rented a large warehouse to sell their products at low prices. It attracted a large base of consumers who had declining purchasing power than before.

This retail idea was exported to continental Europe and formalized there in the 1960s. Over those years, Germany and France saw a gradual upheaval in women's status. There is a proliferation of working women, who had a latent demand for retail outlets of larger size in order to satisfy their one-stop shopping experience. On the other hand, retailers found the idea of edge/out-of-town large retail store as a way to cut the land cost. So a concrete format of edge/out-of-town large retail store - the hypermarket - appears to have originated in France in early 1960s (Dawson 1983: 89-92). This format quickly took off in France and the originating company, Carrefour, opened stores in Belgium, Switzerland, Italy and Britain in the next ten years (Cunningham 1999).

Specifically in Britain, the first hypermarket, Gem, was established in Leeds and Nottingham in 1964. This American company operated stores of approximately 55,000 square feet of sales area. It was later sold to ASDA (Dawson 1994), which has the highest number of hypermarkets to date in the country (Table 3.22).

Table 3.22 - Major hypermarket players in Britain

Player	Number of hypermarket outlets	Average square feet per outlet
ASDA Hypermarkets	20	60,000
Sainsbury Savacentre	13	86,000
Tesco Extra	5	80,600

Source: Cunningham (1999)

Following the opening of the first hypermarket, the superstore, a modified version of hypermarket, which is considered more acceptable to planning authorities in Britain (McGoldrick 1990), was first set up in 1967. The initial development of the hypermarket and superstore concepts in the 1960s in Britain was propelled by contemporary radical changes in managerial, technical and operating methods in retailing (Dawson and Kirby 1977). This also signified a change of strategic direction in retailing. Until then, the mainstream retail direction was concerned with expansion of the multiple shop form of standardized facias and displays in prominent shopping centres (Fulop 1966; Thomas 1995).

Today, the hypermarket/superstore format has been successfully internationalized in many other parts of the world. For example, Carrefour and Promodes, both of which are important hypermarket players although the latter was acquired by the former in 1999, have been very successful in Argentina, Brazil, Portugal, and Spain (Gurdjian et al. 2000). Besides, METRO AG has been enthusiastic in expanding its hypermarket network abroad, which, at the close of 2000, has already a total of thirty outlets outside its home base in Germany (METRO AG 2001).

In Taiwan, this type of format is called general merchandise store. It was first introduced by Makro in 1989, through a joint venture in which SHV in

the Netherlands held the majority share (Retail Market Group 1995). Shortly afterwards, Carrefour entered a joint venture with President Enterprises in Taiwan, and now is the leading player of the format. Another French hypermarket, Promodes, collaborated with Far East Department Store Group in the form of a joint venture to set up Love Buy general merchandise store, while Geant, owned by Casino, also entered Taiwan under a joint venture with Dairy Farm International based in Hong Kong. Recently, Tesco has internationalized into Taiwan, and aims at setting up twenty such outlets in the next five years (Huang 2000). The popular use of joint venture provides support for Dawson's (1994) supposition that the large floorspace mass merchandise store might prefer to use joint ventures and possibly takeover for the purpose of internationalization.

Supermarket The modern supermarket, said to be the 'rough and ready products of the Great Depression' (Business Week 1952), traces its origin to the 1930s in the US. Over that period, retailers tried hard to sell as much as they could at the lowest possible prices. Two of the world's earliest supermarkets were opened around New York, with the opening of King Kullen in 1930 and Big Bear in 1932.

The supermarket is one of the most revolutionary innovations in the whole history of retail development. The outgrowth of the supermarket radically changed the packaging, refrigeration, store design, display and selling techniques. The introduction of self-service as a selling technique is probably the most important concept that the supermarket brings, as it shifts the purchasing responsibility from sellers to buyers. As Zimmerman (1955) pointed out, self-service is the 'heart' of the supermarket.

Until mid 1950's, the supermarket system and its self-service concept had penetrated into more than fifty countries around the globe. Based on the data provided by National Cash Register, Zimmerman (1955) illustrated the internationalization of self-service food stores in mid 1950s (Table 3.23).

Table 3.23 - Self-service stores in 47 countries outside the US in mid 1950s

Country	Number of stores	Country	Number of stores
Algeria	3	Luxembourg	1
Argentina	17	Malaya	1
Australia	763	Mexico	273
Austria	13	Netherlands	131
Bahrein Islands	1	New Zealand	320
Belgium	40	Nigeria	1
Brazil	20	Norway	350
Chile	4	Panama	30
Colombia	3	Peru	3
Denmark	136	Philippines	29
England	2,200	Puerto Rico	62
Finland	55	Salvador	3
France	330	South Africa	150
Germany (East)	6	Sweden	1,500
Germany (West)	194	Switzerland	260
Iran	1	Trinidad	13
Jamaica	1	Turkey	1
Japan	1	Uruguay	1
Kuwait	1	West Africa	2
Lebanon	3	Venezuela	61

Source: Zimmerman (1955)

In England, although there were 2,200 self-service stores by mid 1950s, most of them were small and strictly not qualified to be called a full supermarket. Yet the proliferation of self-service stores was synchronized with the beginning of high growth of the supermarket. Among the 2,200 self-service stores noted, some were of larger size with at least 3,000-4,000 square feet. Stacey and Wilson (1958) noted that there had been 52 full supermarkets owned by the multiples in 1957. The largest supermarket of the contemporary period, opened by William Whiteley Limited in 1954,

occupied a selling space of 12,000 square feet. The supermarket system grew rapidly in later years. By 1966, there were 1,819 full supermarkets owned by the multiples.

In Taiwan, the first so-called supermarket, named West Gate, opened in 1968. It was also the first food store to introduce a price labelling system. Only ambient products were sold in this store because the contemporary level of technology was not good enough to facilitate the sale of perishable produce. Therefore, in a strict sense, it was not a 'western' supermarket.

It was not until 1981 that a full supermarket was introduced to the Taiwanese. This supermarket, named Yen Ji, was opened with strong support from the government. At that time, the distribution channel for perishable farm produce was very inefficient in that many middlemen intervened to take a profit (Wu 1979; Yau 1995; Hsu 1996). The outcome was that retail prices were relatively high and farm prices relatively low. In view of this, the government took the initiative to establish Taipei Agricultural Marketing Company, which opened a number of supermarkets, the first of which was Yen Ji. These supermarkets obtained produce directly from farmers, thus bypassing the middlemen. The success of these supermarkets led to copying by private sector firms.

In the late 1980's, multinational supermarket groups started to enter Taiwan. They were mainly attracted by the rapidly growing economy, in which per capita GNP doubled during the period 1986 to 1991. These multinational supermarket groups were so influential that, by 1995, seven of the top ten supermarket companies in Taiwan were either wholly or partly foreign owned. Many of these foreign owned supermarket companies originate

from Japan (e.g. Sung Ching, Sogo, Kasumi) and Hong Kong (e.g. Wellcome, Park'n), which introduce management practices and retail technology learned from their previous cooperation with American and European retailers (Su 1994), thereby helping to upgrade the supermarket business in Taiwan. By the end of 1998, the number of supermarkets had increased to about 2,600, representing a rapid expansion and diffusion of the network over less than twenty years.

Traditional market The traditional market was developed during the earliest stages of civilization when people had gradually developed sufficient trust toward each other so that they could come together for an exchange of goods among themselves (Kirk, Ellis and Medland 1972[5]). Its importance in retailing, generally speaking, varies with the age of the country, as most long settled civilizations have developed traditional markets during the course of their history. In contrast, countries that were largely settled in the 19th century, such as Australia and the US, are overwhelmingly based on shop trade.

Although the importance of traditional market trading in Britain is less than that in Taiwan, Britain still roughly occupies an intermediate position in any list of countries arranged in order of such importance. For example, it makes more use of the traditional market than Australia, Canada, and the US (Kirk, Ellis and Medland 1972).

The origin and development of the retail format is hardly similar for any pair of countries. In England, the traditional market system was quite formalized in the Roman period, but it had been already rather well established before their arrival. The term market comes from the Anglo-Saxon word 'chepping'

or 'chipping', which became the modern-day 'shopping'. Some evidences of the origin of English markets could be in towns such as Chipping Norton in Oxfordshire (Markham 1998). However, it was not until after Norman Conquest that the traditional market system grew up rapidly by means of royal grants[6] of monopolies to individuals or to corporations, which was one of the most highly regarded medieval privileges (Stacey and Wilson 1958). William the Conqueror continued the practice of the law of Ina made in the late 7th century, which stated that no one should buy anything outside a town except in the presence of credible men. He decreed a charter, stating that sales could be done only in safe places where there was sufficient public administration and security, so as to ensure respect for the authority of the common law and the maintenance of the rights of the Crown.

The practice of offering grants to set up traditional markets is much more usual in earlier years than later years ever since Norman Conquest. According to Vol. I of the Report of the Royal Commission referred to by Kirk, Ellis and Medland (1972), in only about 285 years (1199-1480), more than 2,800 such grants were given. In contrast, from 1700 to 1846, only 24 traditional markets were created. This shows the 'temporal imbalance' of the development of traditional market system in Britain.

The system has also been embedded with the element of 'geographic imbalance'. This ancient retail format is seldom found in Scotland. This is largely due to the late uniting of the two kingdoms, so that Scotland bypassed the period of English history when most charters for markets were granted. The life style in Scotland, whereby communities tended to be more self-sufficient and people have low consumption of fruit and vegetables, are two other possible factors (Kirk, Ellis and Medland 1972). Even within

England, the traditional markets are quite unevenly distributed. The highest ratios of number of towns by county with traditional markets were located roughly on an east-west belt extending through central England and central Wales. On this belted area, the highest ratios of all occur in eastern England from Lincolnshire to Cambridgeshire and Bedfordshire, which suggest close links with arable farming (Scott 1973).

The course of development of the British traditional market system by way of royal grants has been greatly altered by the passing of the Local Government Act of 1858, which gave local authorities conditional powers to establish markets. The jurisdiction of the 1858 Act was extended to urban district councils through the enactment of the Public Health Act in 1875. It was expanded further to rural district councils with the passing of the Public Health Act in 1908.

Nowadays, there are four types of traditional markets in Britain (Kirk, Ellis and Medland 1972). First are those established by common law or franchise. These include charter markets and markets by prescription. In the case of the former, the rights have been granted to any person or body corporate by Royal Charter or Letter Patent still in existence. For the latter, the possessor cannot show the ancient grant but can prove that the right is there, in which case the court agrees to the existence of a lost Charter.

Second are markets established by statute, which are created by special local Acts and those set up under Public Health Acts after 1858.

Third are markets not legally established by franchise or statute, but owned by private individuals or companies. They might realize that most towns

have some large open spaces (such as cattle markets or car parks of football clubs) that are only used on one to two days each week, and therefore target at these places for setting up traditional markets. A private market may only be established if it does not adversely affect the market rights of a nearby legally established market. If allowed, the private operator holds the concession to run a market from a local authority, and pays an annual fee as a return.

Fourth are street markets comprising groups of licensed or registered street traders (e.g. Portobello Road in London) who pay for licenses instead of rents.

In sharp contrast to the nature of the origin and development of the British traditional market system, which is highly political (royal grants) and legal (Local Government Act and Public Health Act), the origin and development of this retail format in Taiwan is highly connected with religious activities that date back to the early 1600's. Buddhist and Taoist temples were central to life in ancient Taiwan. Local communities developed within the sphere of these temples. Traditional markets grew and expanded near the temple to serve the communities. These religious based retail activities, albeit not so common as before, are still present in towns and villages today. There are now still around 10,000 in the country and most maintain some form of retail activities around them.

Compared to Britain, Taiwan classified traditional markets into only two types – public and private. In a public traditional market, the stalls are let for a period of normally three years to prospective interested parties, after which the original tenant is given the first priority to renew the lease. Every such

market has a government-appointed administrator, who is responsible for the maintenance of order, supervision of environmental hygiene, collection of rent, dealing with any unlawful practices of tenants, and clearing of hawkers within two hundred metres of the market (Ministry of Interior 1980a). For a private traditional market, which has to be built on an area of land planned for the purpose and bear an appropriate business license, the letting of stalls is decided by the owner. A committee, which consists of both the owner and tenants, is set up to administer the market (Ministry of Interior 1980b).

3.2.2 Consumption trends

This study chooses the food market in which for studying cross-national consumption trends. Accordingly, the extent of internationalization of food will be first examined.

Food is a typical product that is not easily internationalized (Albaum, Strandskov and Duerr 1998). van Mesdag (1999) suggested two reasons. The first is the recognizability of what is in the food, which is different between cultures. When people are offered to eat something they have never seen before, they are unlikely to try it. The second reason is the 'duration of usage' phenomenon. Food habits in virtually every culture have evolved over a very long duration of usage time when communications between cultures were nearly non-existent. Both of these reasons are concerned with culture. In this regard, Hill and James (1994) noted that, compared to consumer durable and industrial products, non-durable consumer goods, including food, are in general more culturally sensitive (Hill and James 1994). Such cultural sensitivity varies in degree between different types of consumer non-durables. Still and Hill (1984) found that food and general

consumer goods (e.g. laundry detergents, household cleaners) are more susceptive to cultural/country/environmental differences than cosmetics or pharmaceutical products.

Following easy communications between countries particularly after the Second World War, people began to recognize more and more foods of other cultures, and the 'duration of usage' effect is becoming less important (van Mesdag 1999). In Britain, curries, fresh pasta, salami sausages, pates, Chinese and Thai dishes, quiches, brownies, baguettes, sauerkraut, cheesecake, smoked ham and pizzas are traditional foods from other cultures that are picking up in the food market. In Taiwan, yoghurt, steak, grape wine and small fire pot are a few successful examples of ethnic foods. However, as food habits are a cultural and anthropological phenomenon (Murcott 1983), it is difficult for a person to be assimilated into the food habits of a different culture. Wardle (1977) noted the strong cultural dimension of food. By quoting Margaret Mead, he defined food habits as 'the culturally standardized set of behaviours in regard to food manifested by individuals who have been reared within a given cultural tradition'.

Although food itself is not easily internationalized, the meaning/implication behind the food itself can possibly be internationalized. For instance, Miller (1995), quoting the work of an advertising agency DMB&B that looked into consumption behaviour of more than 6500 teenagers in 26 countries, noted that teenagers across countries patronized American fast food chains. This may reflect the internationalisation nature of the pursuit of some latent attributes – convenience and youthfulness of eating – of the food, rather than the food (such as hamburgers and chips) sold in these chains. van Mesdag

(1999) noted that a food product that meets international lifestyles is more likely to succeed.

The pursuit of convenience and health in the food market is not restricted to Britain and Taiwan as discussed in section 3.1.2 above. From the worldly viewpoint, nutritional supplements that are representative of the health trend are expected to experience fast growth at 10% on average per year (World Food Chemical News 2000). Across many European countries, health is regarded as the second most prominent trend[7] in new product development.

3.3 Chapter summary

This chapter discusses the macro-based development and the extent of internationalization of each object of analysis, which is either a retail format or a consumption trend. The former provides a snapshot of the trend of usage intensity of the object in question from the supplier perspective, which complements the consumer perspective taken for the mainstream analysis of this study. The latter, by probing into how internationalized is each object in question supposed to be, provides evidence to substantiate the argument for its inclusion in the study.

Internet retailing has been shown to have promising growth potential in both Britain and Taiwan. Total online sales in the UK are predicted to occupy 7.5% of total retail sales by 2005, signifying a substantial increase over a 0.2% share in late 1998. In Taiwan, electronic commerce revenue, which includes

business-to-business and business-to-consumer, is forecasted to increase from US$2.3 million in 2000 to US$20.7 million in 2004.

Contrary to Internet retailing, physical retailing of the hypermarket, the superstore and the supermarket poses a variance in definitions between Britain and Taiwan. This Chapter describes these definitions, which will be reconciled in the next Chapter – research design phase – of the thesis. A comparison between the development of different physical retail formats, assisted by the adoption of the person index and the land index, confirms that the difference in the growth stage of hypermarket/superstore retailing is much greater than that of supermarket retailing between Britain and Taiwan. This may reflect, by confining to the two countries, some difference in the internationalization capability and potential between the two retail formats. A within-country comparison shows that the supermarket achieves a greater success in diffusion by recording a lower average number of persons per outlet and a higher average number of outlets per thousand square kilometres of land than the hypermarket/superstore and the traditional market for both Britain and Taiwan. So from the perspective of macro-based diffusion, the internationalization capability and potential of the supermarket is greater than the other two retail formats being examined.

Clear sights of convenience and health trends in the food market for both Britain and Taiwan are found. For example, in Britain, five of the ten food products having the greatest increase in underlying demand are more or less linked to the pursuit of convenience, while six of the ten such products can be generally related to the craving for health. In Taiwan, expenditures on both convenience- and health-oriented food products have been increasing over the last decades. So as with the modern retail formats including the

Internet, the hypermarket/superstore and the supermarket that have shown their footprints scattered around the globe, the convenience and health trends may also be taking shape elsewhere in the world.

The extent of internationalization of each object of analysis in question is examined through tracing both its origin and its trait of internationalization. For the Internet, the release of the Mosaic browser for Unix systems promoted an explosive growth of the Internet all over the world. Since then, the Internet has been often categorized as an internationalized product or idea. For example, 58% of all consumers surveyed outside the US have bought from an online company located in a foreign country.

The retail idea of the earlier version of the hypermarket/superstore traces to the US of the 1930s, and began to show its internationalization vigor in the 1960s. From then on, the hypermarket/superstore system has been rapidly developed in Britain, Germany, France, and many parts of the world. Although the system arrived in Taiwan only in the late 1980s, the pace of development seems to be faster than those of western countries that embraced the system at an earlier stage.

The modern supermarket traces its origin to the 1930s in the US, where two of the world's earliest supermarkets were opened around New York. Until mid 1950s, the supermarket system and its self-service concept had penetrated into more than fifty countries. In England alone, by 1966, there had already been 1,819 full supermarkets owned by the multiples. In Taiwan, the first full supermarket was introduced in 1981. By the end of 1998, the number of supermarkets had increased to about 2,600, representing a rapid expansion and diffusion of the network over less than twenty years.

The traditional market is one of the earliest forms of institution in the history of human civilization. In England, the traditional market system, which was quite formalized in the Roman occupation era, was rather well established before their arrival. It was expanded mainly through the practice of offering royal grants, which has been gradually obliterated since late 1850s, when the passing of the Local Government Act gave local authorities conditional powers to establish traditional markets. In sharp contrast to the nature of the origin and development of British traditional market system, which is highly political and legal, the origin and development of the traditional market in Taiwan is closely attached to religious activities dated from the early 1600s, when traditional markets grew and expanded near the temple to serve the communities.

Food, whose market is taken as the context for analyzing convenience and health trends in this study, is a typical product that is not easily internationalized. Two suggested reasons are the difference in recognizability of what is in the food between cultures and the 'duration of usage' phenomenon. In contrast to the food itself that is not easily internationalized, the meaning and implication behind the food, such as pursuit of convenience and craving for health whilst choosing food products, can possibly be internationalized.

Scrutiny of the extent of internationalization suggests an allegation that all the retail formats and consumption trends, except the traditional market, possess internationalization capability and potential to a noticeable extent.

Note

[1] A criticism against the definition is that 'closeness to home' is also an important attribute of a retail format, e.g. a convenience store.

[2] There are two types of players in Internet retailing. 'Online retailers' are virtual retailers, existing only online. 'Online store-based retailers' have the brick-and-mortar retail outlet besides the virtual outlet (Morganosky and Cude 2000).

[3] for the purpose of clarity, 'general merchandise store' will be called 'hypermarket/superstore' at appropriate places throughout this study.

[4] Internationalization of retail formats is considered in this study as a facet of retail internationalization, which has been noted by Dawson (1994) as not only confined to opening stores in foreign countries, but also covering a wider range of facets.

[5] Kirk, Ellis and Medland (1972) is the key reference used in the discussion of the origin and trait of internationalization of the traditional market. This is because no analytical publication, apart from the evidence given by a handful of witnesses at Commissions of Enquiry in Victorian times, about traditional markets had been made before (Kirk, Ellis and Medland 1972). Probably due to the diminishing importance of the traditional market in the retail sector, there has been no publication focusing on this retail format in the last thirty years. Nevertheless, some other references that occasionally discuss the traditional market are also used.

[6] Watford town, for example, received the royal grant of a traditional market during the reign of Henry I. It was to be owned by the Abbot of St. Albans and held on a Tuesday. At first, it would have been a group of booths and stalls, erected at the start of business and taken down when the day finished. Gradually, by the 14th century, these came to be replaced by permanent structures on the same site, continuing the typical long thin triangular shape of a medieval market town (Watford Museum 2001).

[7] The first most important trend is authenticity, i.e. to consider the preferred flavours of the Europeans in new product development, e.g. mango flavour that is preferred by the Germans (Food Technology 1999).

Chapter 4 – Research Design

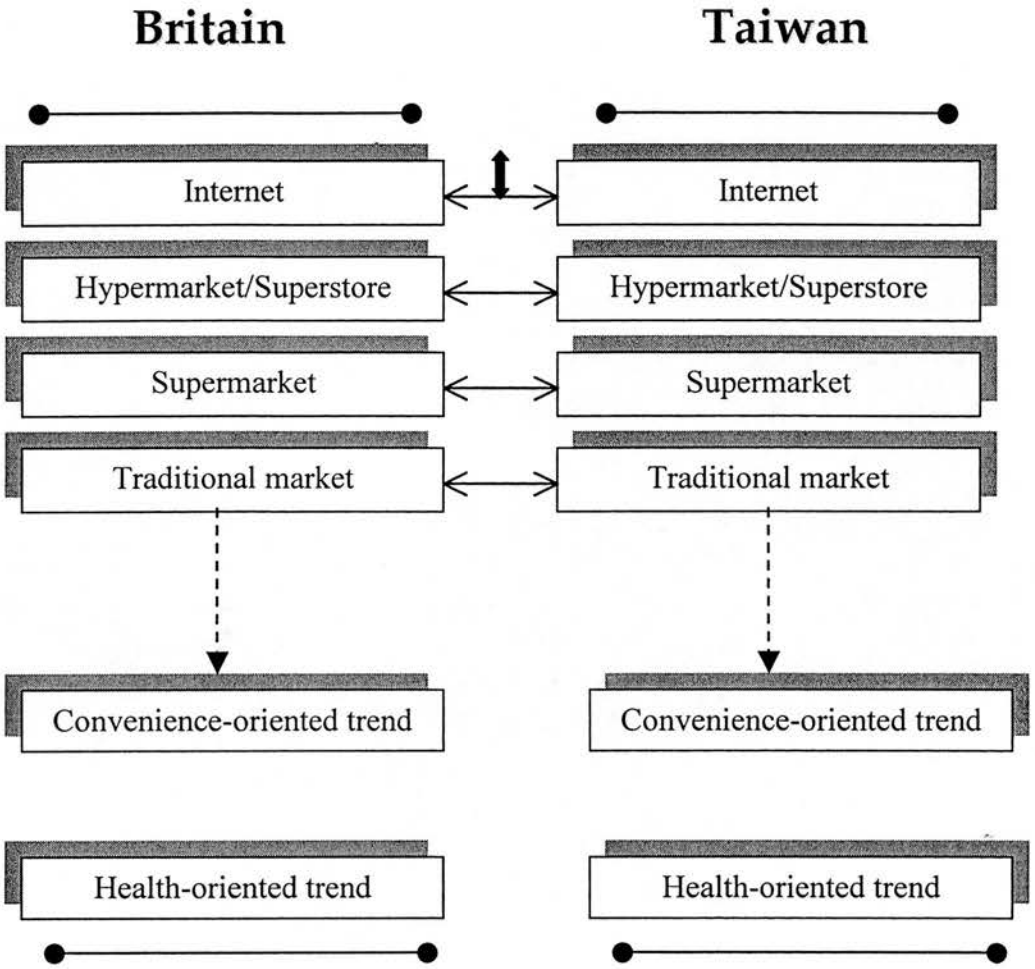
The research scope of this study, in terms of segmentation targets, covers four retail formats and two consumption trends. Except for the traditional market, all these retail formats and consumption trends, as discussed in the preceding chapter, are found to transcend national boundaries, and therefore can be regarded as internationalized products. The traditional market, which is commonly regarded as a culturally bounded institution, is included in the research design because it can serve as a benchmark against other internationalized retail formats being studied. There may be something wrong in either the data or the analysis if the national country dimension is found to be more significant for internationalised retail formats than the traditional market.

In the initial stage of research, each of the six segmentation targets had been originally planned for cross-national consumer segmentation analysis. However, what can be analysed depends on the content and structure of data collected. As will be explained in the latter part of this chapter, the four retail formats for Britain and Taiwan are found to pass the equivalence test so that they are comparable to each other. In contrast, the two consumption trends do not pass the test. Therefore, inter-country analysis that involves *direct comparison* of data and pan-country analysis that requires the collapsing of the data from both countries, cannot be conducted. Instead, only intra-country analysis will be conducted for each of the two countries, and results will be *'indirectly compared'* by looking into the demographic structure of followers of the convenience or health-oriented trend in the two countries.

Of the four retail formats and two consumption trends, the Internet is the youngest phenomenon. Internet shopping is still a new idea to consumers, and was particularly so in 1998, the year of data collection for this study. Therefore, corresponding results may partially reflect temporal instability. In order to reduce the likelihood of such instability, cross-national consumer segmentation will be conducted for the Internet based on two time bases – 1998 and 2000. All the other retail formats and consumption trends will be analysed on the same time basis of 1998.

A brief diagrammatic representation of this study's research design is shown in Figure 4.1. The line with dot on both ends refers to intra-country analysis. The double-edged arrow refers to inter-country and pan-country analysis. The dashed arrow refers to the switch of focus from retail formats (where to shop) to consumption trends (what to shop for) within the retail system. The solid vertical double arrow refers to temporal analysis in the same spatial context.

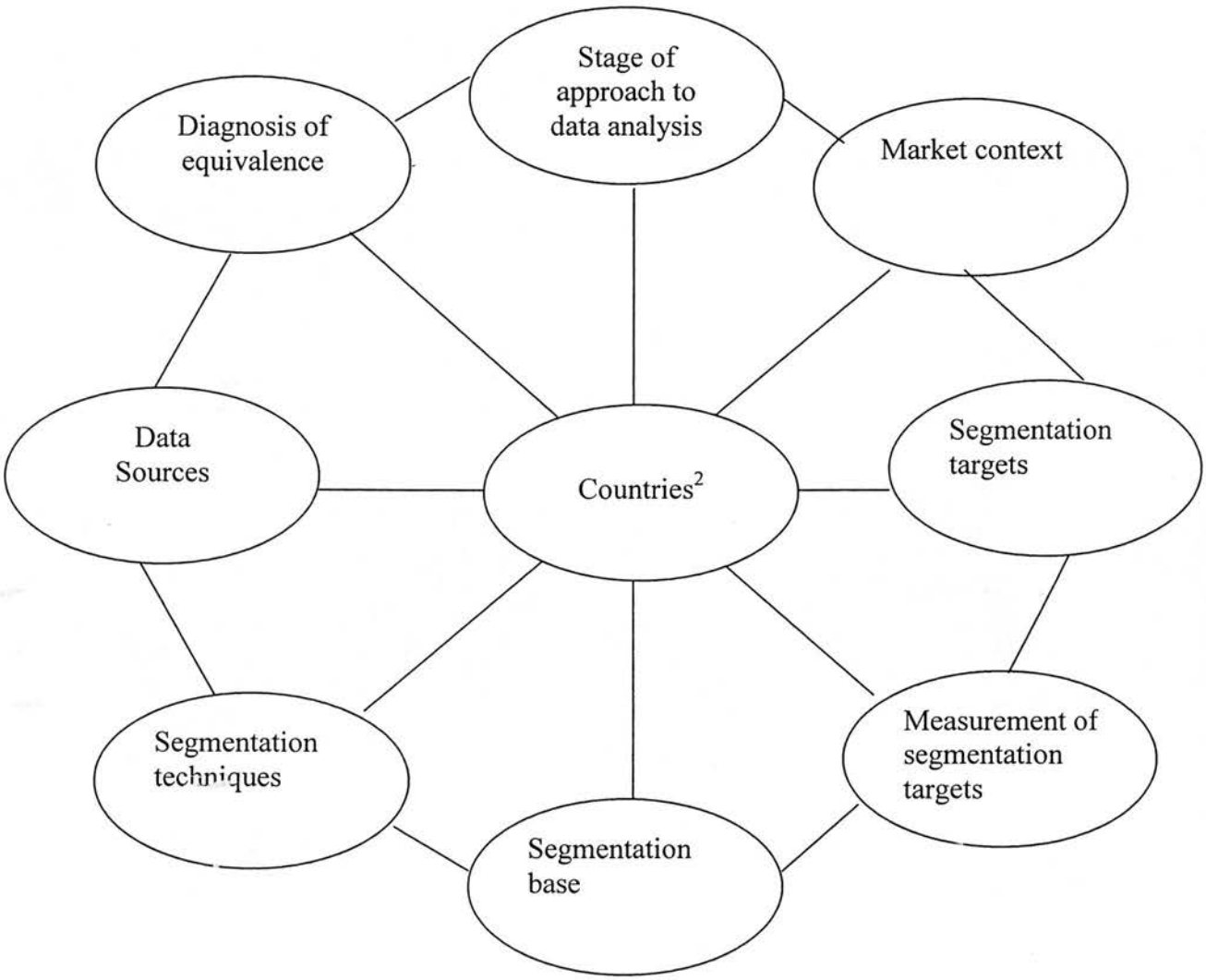
Figure 4.1 - Brief diagrammatic representation of this study's research design*



* Explanations of different types of arrows are in the main text

The following sections provide rationales for decisions on the choices in different stages of the research design process. The seven major choices are shown in Figure 4.2.

Figure 4.2 - Choices in research design process of the study[1]



[1] The web structure indicates the interdependence among choices

[2] This being in the centre of the web does not imply anything other than being one of the choices

Most of these choices are interdependent on decisions of some other choices. For example, a market context includes a particular range of segmentation targets that can be chosen. In the food and grocery market, the supermarket is a viable segmentation target. In the fashion market, the boutique is a

popular choice. A particular segmentation base may be more appropriate for a particular market context than the other. A general observable segmentation base (such as demographic variables) has been found to work quite well in the food market. In the financial service market, general unobservable segmentation bases (such as lifestyle traits) may be more appropriate (Harrison 1996). On the other hand, every segmentation technique is subject to the structure of data collected. For instance, standard regression technique is possible only when the dependent variable is of integer or ratio data. Choice of countries is constrained by whether data for these countries are available. The nature of the data also greatly determines the stage of approach to data analysis. If the data between countries are not comparable, they cannot be combined for the analysis.

Because of the interdependent nature of the choices, it is not suitable to set up an order of sequence in making decisions on these choices. The sequence of the choices elaborated below does not signify the order of the research design process. Rather it is determined in a way that, this study believes, matches the common logic of thinking. Therefore, the sequence runs as follows:

1. Choice of countries
2. Choice of within-country market context
3. Choice of segmentation targets found in the market context
4. Choice of the means of measuring these segmentation targets
5. Choice of bases used to segment the segmentation targets
6. Choice of segmentation techniques applied to work out a relationship between targets and bases so selected
7. Choice of data sources needed for the work

8. Choice of targets to be diagnosed for equivalence between respective data sources
9. Choice of the approach of analysis that matches the nature of the data collected

4.1 Choice of countries

Britain and Taiwan are selected for conducting cross-national consumer segmentation research of their retail systems. There are methodological, academic, business and private reasons for this selection.

Methodologically, Britain and Taiwan are quite 'historically independent' (Hammel 1980), thereby ensuring that no occurrence in one case has a significant influence on the outcome of another case. Besides, cross-national research necessitates a balanced knowledge about the cultural norms, social contexts and histories of the countries involved. This requirement arises from the fact that one's understanding of foreign cultures is often much less than that of his/her own culture (Armer 1973). An unbalanced understanding between countries poses a threat in obtaining equivalence in one's cross-national research design and constrains one's ability to comprehend the results of the study. The problem of equivalence will be further aggravated if the researcher is too familiar with one of the countries involved. McLuhan (1964) mentioned that being too familiar with the country that one is studying may lead one to be influenced by 'the bias and pressure exerted by any technical form of human expression' in that country.

The author of this thesis has been working in Taiwan for about ten years and will have stayed in Britain for nearly five years. Living in Taiwan is relatively but not excessively longer than that in Britain, but life experience in

the latter is fresher than that in the former. Therefore, the need to possess a balanced understanding of the two countries concerned is largely met. On the other hand, neither Taiwan nor Britain is the author's country of birth, and therefore there is not much problem of being too familiar with either of these two countries.

Academically, previous cross-national consumer segmentation research focused upon developed countries (e.g. purchasing behaviour patterns in the US and France by Douglas (1976)). On a broader view of social science studies, Hakim (1987) noted that 'international comparative studies are most commonly restricted to industrialized societies'. Relatively little was undertaken on less developed countries. In addition, a developed versus developing distinction cannot reflect the heterogeneity of the international marketplace (Nachum 1994). Among less developed countries, newly industrialised countries (NIC's) offer greater market opportunities in terms of per capita income than others, thereby deserving increased attention for international marketing purposes (Douglas and Craig 1992). Taiwan, classified as one of the newly industrialised countries (Lasserre and Schutte 1995), is selected in this study so as to broaden the diversity of geographic bases for cross-national consumer segmentation research. Considering the significant cultural differences between Britain and Taiwan (Hofstede 1983), if a trans-national consumer segment for these two countries is successfully identified, its resultant significance to internationalisation will be greater than for two countries that are less culturally different.

With regard to business reasons, Taiwan has undergone rapid economic growth during the last ten to fifteen years, and provides plenty of trade opportunities. Therefore, Gazeley (2000) advocated the inclusion of Taiwan

as one of the key export markets for Britain. He conducted an analysis and identified three market sectors worthy of increased attention. These are the retail sector, the consumer goods sector, and the food and drink sector. Gazeley also treated Taiwan as an ideal test market for British enterprises aiming at mainland China. On the other hand, Taiwan has been over-dependent upon the US and Japan in its external trade. Europe is an ideal candidate for diversification, and the UK is a stronghold for Taiwanese enterprises (Nicholson 2000).

Concerning personal reasons, the author has been living in Taiwan and Britain each for a number of years. The resulting greater sense of familiarity with these two countries than any other foreign countries could often provide research design and analysis in a better way than what an outsider can do (Oyen 1990), and may assist further in interpreting the findings of the study with greater insight, thereby 'increasing the value of any forthcoming explanatory statements' (Hakim 1982).

4.2 Choice of market context

Figure 4.1 above shows that, conceptually, 'where to shop' and 'what to shop for' are the segmentation targets of the study. The scope of these targets to be chosen, however, is dependent on the market context one is researching. Retail formats and consumption trends in one market context are likely to be different from another.

The food sector is chosen as the market context in which to choose specific segmentation targets for the following three reasons.

Firstly, food is one of the most important portions of consumer spending in every part of the world. Within all the named categories of consumer expenditure in the UK, food is ranked the highest (Office for National Statistics 1998). In Taiwan, food spending is also ranked the top (Directorate-General of Budget, Accounting and Statistics 1998). In addition, the food expenditure pattern has great impacts on retailing, manufacturing, processing and farm production (Marshall 1995). This suggests a market of substantial size and chain effect worthy of international marketing efforts.

Second, food intake contributes much to the improvement and maintenance of health. For instance, there is some evidence that fibre, polyunsaturated fatty acids, antioxidants and other phytoprotectants can influence obesity, immune function, cognition, osteoporosis, cancer and cardiovascular disease in a beneficial or protective way for human beings. Taking pre- and probiotics may help to optimise the beneficial effects of gut flora. Reducing fat intake contributes to the prevention of coronary heart disease and stroke (Economic and Social Research Council 2000). Understanding where people shop and what they shop for in the food sector could provide information useful for policy planning.

Third, the food sector in general requires a more sophisticated physical distribution system than many other non-food businesses (Myers 1996). For example, a cold chain has to be established to transport and store frozen foods. Other temperature chains are required for the physical distribution of some other food products. This requirement means that, whilst many non-food businesses have the opportunities to explore a new international market on an incremental basis, food entrepreneurs have to invest more in logistics in general and accordingly will adopt a more committed approach for

international expansion. Therefore, the food sector is deemed an appropriate market context for this study because cross-national consumer segmentation is more likely to be part of a longer-term strategic activity.

It has to be noted that although the food sector is chosen as the market context for the study, it is difficult to neutralize the influence of other sectors given the scrambled merchandising nature of the retail system. People often go to supermarkets for stocking non-food grocery items. They may even buy electrical goods or clothes in hypermarkets/superstores. What can be ascertained is that all the retail formats chosen in this study have food as one of their major sales categories.

4.3 Choice of segmentation targets

In every consumer product market, consumer choice usually involves two types of decisions, i.e. where to buy and what to buy. This study assesses both types of decisions. Three considerations are at work in deciding which specific segmentation targets within the confine of the two decision types are chosen. These are the market size, the market potential, and the internationalisation potential.

4.3.1 Market size

In this study, market size is approximated by the usage rate that refers to the number of users divided by the national population.

Table 4.1 shows the usage rate of each major retail format in the food market for both Britain and Taiwan. In Britain, the leading four retail formats, in terms of usage rate, are the supermarket, the hypermarket/superstore, the convenience store, and the traditional market. These same formats are also

four of the seven most heavily used retail formats in Taiwan. The other three formats, namely hawker, bakery, and fruit store, are not chosen because they are not internationalised formats suitable for this study. Of the four aforesaid formats, modern convenience store is an internationalised retail format, earns high usage rates in both Britain and Taiwan, and therefore should be a good candidate for inclusion in this study. However, the convenience store in Britain, as shown in Table 4.1, includes both modern convenience store and traditional grocery. This will contaminate the data, as these two types of stores represent different orientations in terms of their internationalisation capability and potential. With the exclusion of the convenience store, the remaining three leading retail formats in Britain are chosen as segmentation targets in this study – supermarket and hypermarket/superstore as representing internationalised retail formats, and traditional market as the most typical localized retail format for benchmarking purpose.

Table 4.1 – Usage rate of different retail channels in 1998[1]

Retail channel	Britain (%)	Taiwan (%)
Supermarket	**69.8[3]**	**71.2**
Convenience store[2]	43.5	93.5
Hypermarket/superstore	**40.3[4]**	**51.7**
Traditional market	**20.2**	**77.6**
Hawker		81.3
Bakery		64.7
Fruit store		51.9
Rice store		39.7
Cooperative		37.9
Vending machine		31.6
Betal nut stand		17.9
Oil store		13.8
Direct selling		10.0
Catalogue buying		4.3
Television shopping	3.0	3.1
Internet	1.8	0.8
Petrol station	10.3	
Home delivery	10.1	
Farm shop	6.9	
Pre-order and collection	1.9	

[1]Empty cells represent data not available

[2]Including modern convenience store and traditional grocery

[3]Referring to town centre/high street supermarket, including food mall within department store

[4]Referring to edge/out-of-town retail store, which mainly includes hypermarket and superstore

Source: Healey & Baker (1999) and Council of Agriculture (1998)

4.3.2 Market potential

Although the usage rate of the Internet for shopping was low in the two countries as of 1998 (Table 4.1), its future growth is viewed as optimistic for both Britain (Enos 2000) and Taiwan (FIND 2000). As using the Internet in the first place is the threshold through which Internet shopping can then be made, the number of Internet users is taken as a 'leading indicator' of the prospect of Internet shopping in a particular country. In this regard, both Britain and Taiwan are ranked among the top fifteen countries (Table 4.2),

signifying their potential for Internet shopping compared to many other countries.

Table 4.2 - Top 15 countries in terms of the number of Internet users by the end of 2000

unit: millions

Country	Number of Internet Users	Percentage of total
United States	135.7	36.20
Japan	26.9	7.18
Germany	19.1	5.10
UK	**17.9**	**4.77**
China	15.8	4.20
Canada	15.2	4.05
South Korea	14.8	3.95
Italy	11.6	3.08
Brazil	10.06	2.84
France	9.0	2.39
Australia	8.1	2.16
Russia	6.6	1.77
Taiwan	**6.5**	**1.73**
Netherlands	5.4	1.45
Spain	5.2	1.39

Source: Cyberatlas (2000)

4.3.3 Internationalisation capability and potential

Cross-national consumer segmentation is more practically useful if the segmentation target in question possesses a greater capability and potential of internationalisation. If a certain group of heavy consumers (e.g. lower income class) are found for a non-internationalised segmentation target (e.g. hawker) across countries, it is likely to be due to reasons other than internationalisation capability and potential of the target concerned. This result is less useful for the purpose of international marketing, whose main aim is to sell the products/services/ideas beyond the domestic country.

Not every product has the same degree of internationalization capacity/potential. Some are more ready to be internationalized than others.

Blackwell, Ajami and Stephan (1994) noted that consumers around the globe are adopting some products, services and ideas arising from the same lifestyles, but culture and traditional values do not disappear. Albaum, Strandskov and Duerr (1998) posited that computer chips, automotive electronics, colour films, pharmaceutical, chemicals, telecommunications, and network equipment are fast changing in nature but are standardized, thereby allowing them to be more readily to be internationalized. They also pointed out that music attracts consumer segments that transcend political and geographical boundaries. The musical tastes of a teenager group in some Far Eastern countries are similar to some teenagers in European countries. Some forms of art and styles, such as those used on furniture, silverware and china, are also sought by certain consumer segments across many countries.

Hankinson and Cowking (1993) suggested that internationalization is more likely to be in products/services/ideas that are not affected by cultural differences. Products/services/ideas that are not culturally sensitive or that are associated with growing consumer affluence are more capable of using single worldwide theme, though often still involving some adaptation, to promote.

The previous chapter has provided prima facie evidence or comments that the Internet, the hypermarket/superstore, and the supermarket are internationalized retail formats. By contrast, the traditional market is a culturally specific institution. The preceding chapter also noted that convenience and health are the two popular trends across countries and sectors. These trends are evident in the British and Taiwanese food markets. Table 4.3 summarizes what has been elaborated in the previous chapter by

very briefly describing the internationalization capability and potential of all the chosen segmentation targets for this study. The description may be subjective, but the general idea should be close to the truth.

Table 4.3 – Extent of internationalisation

Segmentation target	Internationalisation capability and potential
Retail format	
Internet	Very high
Hypermarket/superstore	High
Supermarket	High
Traditional market	Virtually impossible
Consumption trend	
Pursuit of convenience	Probably high
Craving for health	Probably high

The Internet is denoted as possessing 'very high' internationalization capability and potential, because there has been an abundance of studies that explicitly suggest the internationalization nature of this type of retail technology. Pursuit of convenience and craving for health are described as 'probably high', because these two internationalized trends are tested in this study using culturally sensitive food products as the proxy.

So with the exception of the traditional market that is chosen for benchmarking purpose, all the other segmentation targets are found/deemed as possessing high capacity/potential of internationalization that is desirable for cross-national consumer research.

An added benefit of choosing these segmentation targets from the perspective of internationalization capability and potential is that all these targets are, in essence, service-oriented rather than product specific. Retail formats are clearly within the confine of the service sector. Convenience-

oriented and health-oriented trends, represented by corresponding food products, signify the service gap that retailers and manufacturers can fill. This dovetails the future market need, as Dahringer et al (1994) noted that the next great battle for global market competition is in the services industries, including retail formats and innovations to meet contemporary consumption trends.

4.4 Choice of measurement of segmentation targets

Four of the six segmentation targets in the study are retail formats. It is therefore useful to refer to Spiggle and Sewall (1987) who outlined three possible measurements of retail selection. The first is retail preference, referring to a consumer's statement of positive affect about a given store, which may or may not result in store choice or patronage. The second is retail patronage, which refers to a consumer's purchase pattern over a series of purchase tasks, such as 75% of expenditures at one particular store and other 25% elsewhere. The third is retail choice, which is concerned with the result of a specific purchase task, and the outcome is binary because the consumer either uses or does not use the store.

As this study is cross-national in nature, it may be problematic to measure respondents' perceptions and preferences of a retail store, and compare them between countries. Between retail patronage and retail choice, it is less liable to error (such as due to memory loss) for respondents to record whether they choose a particular good/service than how much they spend on it. Therefore, it is the third measurement, retail choice, which is preferred in measuring the use of retail formats in this study.

Regarding consumption trends, previous consumer studies focused more on the expenditure decision (how much/many to purchase or consume) than on the participation decision[1] (whether to purchase or consume) (Fine, Heasman and Wright 1996). In the field of study on food consumption that used UK National Food Survey data, prior to Fine, Heasman and Wright (1996) and Young, Burton and Dorsett (1998), most, if not all, studies considered only the expenditure decision. One main reason is that the dichotomous response variable arising from using the participation decision approach will paralyse the calculation of demand parameters on the basis of standard statistical techniques (e.g. standard multiple regression). However, modern statistical techniques, such as logistic regression, that accommodate dichotomous response have been developed. Therefore, any statistical concern that surrounds the dichotomous response variable is largely relieved. In addition, understanding the distinction between participants and non-participants is an important analytical problem in its own right (Fine, Heasman and Wright 1996). To distinguish between those who participate from those who do not is often more important than to distinguish between different levels of purchase/consumption. Therefore, this study chooses the participation decision in measuring the use of products representing convenience- and health-oriented trends.

4.5 Choice of segmentation base

The retail system of any society is shaped by a wide variety of demographic, cultural, social, economic, legal and technological variables (Brown 1987). These variables collectively influence individual choice, which, in aggregate, are reflected in the overall structure of the retail system (Shaffer 1973; Douglas 1976; Golberman 1978). Groups of individuals respond differently to these variables, which both generally and on special occasions have a

significant impact on the choice where to shop at and what to shop for. This study chooses demographic variables in a broad sense[2] and on a micro basis[3] as the segmentation base, which as a whole is classified as general observable segmentation base discussed in Chapter 2.

The demographic variable set is one of three usual types of bases for cross-national consumer segmentation (Walters 1997). The other two types are the lifestyle variable set (classified as general unobservable segmentation base) and the behavioural variable set (often classified as product-specific observable segmentation base). Lifestyle-based segmentation is often measured in terms of the activities, interests and opinions of consumers being studied. In this vein, Douglas and Urban (1977) found out salient life style similarities across women in France, UK and US. Yet Eshghi and Sheth (1985) warned that lifestyle and consumption behaviour are not necessarily closely related. Behaviour-based segmentation attempts to delineate consumer groups according to what they behave. By utilising behavioural data, Anderson and Engledow (1977) came up with a 'cross-cultural elite of affluent and information sensitive consumers', who are likely to respond quite uniformly to international marketing efforts. However, Thorelli (1990) noticed that standardised exploration of this cross-cultural segment would be hampered by local competition, marketing infrastructure and country laws. Demographics-based segmentation relies on demographic information of individuals across countries for tracking down cross-national consumer groups. In this respect, Hassan and Katsanis (1991) identified two global segments, namely the 'global elite' segment and the 'global teenager' segment. The 'global elite' consumers are usually well educated, earn high income, lead an 'elite' way of living, and are more inclined to wear clothes of

world-class brand than other people. The 'global teenager' consumers are supporters of cutting edge fashions and pop music.

Comparing between the three types of segmentation bases, Craig and Douglas (2000) pointed out that attitudinal, psychographic and lifestyle data are more likely to give rise to significant problems than demographic data for cross-national consumer research. This is mainly because respondents' interpretation of the same attitudinal, psychographic or lifestyle questions across cultural settings is likely to be different (Mintu, Calantone and Gassenheimer 1994). Some popular attitude measures such as Likert and semantic differential have been found to be culture-specific even among countries with some commonality such as Japan, South Korea and China (Yu, Keown and Jacobs 1993). In this regard, Davis, Douglas and Silk (1981) conducted an empirical study comparing the two types of data, and concluded that:

'The evidence of reliability differentials appeared to vary according to the type of variable, being less likely to occur for hard variables like demographic characteristics and more likely to occur for soft variables such as task/decision involvement and life-style/psychographic factors'.

This becomes the main reason for choosing demographic variables in the study. Although demographic variables are not the most effective for segmentation purpose, they are often preferred. It is because they are, among others, relatively easy to collect, reliable and generally stable (Horton 1984; Loudon and Della Bitta 1984). Chapter 2 shows that, based on Wedel and Kamakura's classification framework, the general observable segmentation base scores the highest in aggregate as against other competing

segmentation bases. It is therefore fair enough to say that, *in general,* demographic variables possess some strength over other types of segmentation variables, and such strength is more evident in cross-national as opposed to domestic research. Yet whether they are the most appropriate choice also depends on the *specific* object being examined.

This study uses the retail system within the food market context for choosing a collection of targets to be examined. Accordingly, a review of previous studies, which assessed the influence of demographic variables on retail choice and food choice, could provide further support for the choice of demographic variables in the study.

A review of 20 studies of retail choice[4] was conducted. Nineteen of them found a significant influence of demographic variables, more or less, on the choice of some retail format. Studies related to Britain and Taiwan will be discussed first, followed by studies in other parts of the world.

Bromley and Thomas (1995) compared personal characteristics between in-town and out-of-town shoppers in Ystalyfera in South Wales. They found that shoppers who don't shop out-of-town (mostly superstores or hypermarkets) are usually the elderly, from households without anyone in employment, and the carless. East et al. (1995) studied personal characteristics between in-town and out-of-town supermarket shoppers in England and Wales, and found that people aged from 25 to 44 prefer to large out-of-town supermarkets. The findings of these two studies pass the statistical significance test, which showed that demographic variables could differentiate shoppers from non-shoppers in some British retail formats.

In Taiwan, Shih (1998) found that the usage behaviour of large-sized retail formats is positively related to age, occupation, family income, and household size. Use of medium-sized retail formats is also positively related to age, occupation, and household size, but negatively related to education level. One weakness of this study is that large-sized and medium-size retail formats are not well defined, which is likely to render the forthcoming result less precise. Lee (1996), on the other hand, focused on Internet usage. He found that Internet users among university students in Taipei could be segmented by a number of demographic variables such as gender, age and education. By contrast, marital status, occupation and income were insignificant variables. Although this study is hardly representative of either Taipei or Taiwan, and is related to online users in general rather than online shoppers, it is considered a helpful reference because it is probably the pioneering study on market segmentation of the Internet in Taiwan.

Elsewhere the contribution of demographic variables to retail choice can be found. Jarratt (1998) found a direct association of specific demographic and psychographic variables with outshopping in Sydney, Australia. For example, education, income and socialization are positively associated, while age is negatively related. She also found that demographic variables seem to have a greater impact on outshopping than psychographic variables.

In the US, three studies relating demographics to retail choice had been reviewed. In the northern part of New England, Yucelt (1988) found no significant relationship between demographics and out-of-town shopping. Yet he identified a number of demographic variables that significantly affect in-town shopping: age and education exerted positive effects, while gender and occupation status produced negative effects on in-town shopping. The

second US-based study was conducted in Dublin, Georgia. Here Reynolds and Darden (1972) found some demographic variables influencing outshopping and some other demographic factors not influencing outshopping. Out-of-town shoppers were likely to be middle aged, attain higher education level, earn higher income and be urbanised. On the other hand, these shoppers could not be identified in terms of occupation, household size and the number of children. The third US-based study was carried out in a college town in the US (Darden and Lumpkin 1975). Years of education of husband, income, and age of the youngest child were found to exert positive effects on the use of convenience store.

In Hong Long, Goldman, Krider and Ramaswami (1999) discovered a number of characteristics of fresh food buyers in supermarkets. They are more likely to have higher household income, live in larger apartments, obtain access to greater personal living space, own a car, and employ domestic food helpers. One potential analytical problem of this study is that some or all of these significant characteristics are likely to be highly correlated with each other, thereby biasing the result so obtained.

In Petaling Jaya of Malaysia, Zain and Rejab (1988) used demographics to differentiate the choice between retail formats. The highly educated were keener to go to supermarkets. In contrast, people of secondary or low education were more inclined to use wet markets, night bazaars and conventional retail stores. They also found that distance travelled did not affect the choice between retail formats.

In Madrid, Spain, Rivas and Grijalba (1985) found that age and income are important variables influencing consumer choice between retail formats.

Young people are more inclined to patronise hypermarkets and supermarkets, and less inclined to use traditional grocers, than older people. Lower income people are more prone to visit market stalls than higher income counterparts.

Keng and Ehrenberg (1984) compared consumers who primarily shopped at supermarkets with others who mainly used other food stores on the basis of their demographic and socio-economic characteristics, life-style orientations, and grocery shopping habits and characteristics.

However, in Turkey, Yavas, Kaynak and Borak (1981) found that demographic variables could not differentiate consumer choice between supermarkets and other food stores.

So a review of retail choice studies showed that demographic variables are not always found to be influential. However, considering an overwhelming majority of studies verifying the significance of these variables, it is fair enough to say that, in general, they are effective in segmenting consumer choice of retail formats. This can be further substantiated in Korgaonkar, Lund and Price (1985), who summed up a considerable body of empirical studies on the choice of both retail formats and retail stores, including, among others, Rachman and Kemp (1963), Rich (1963), Myers (1963-4), Bearden, Teel and Durand (1978), and Crask and Reynolds (1978), and found that all of them suggest a relationship between retail choice and demographic variables.

A comparison of results of the studies reviewed for this thesis showed that some demographic variables are found significant while others are not.

Besides, the same significant demographic variable does not necessarily exert the same direction of effect on retail choice. For example, comparing between Bromley and Thomas (1995) and Yucelt (1988), age was found to produce a positive effect on in-town shopping in both studies. Yet the direction of effect of occupation status was different. This is probably due to cultural, geographic and time factors. The two studies were conducted in different countries and years. So the divergence of results in these two studies should not discredit the use of demographic variables in the study of retail choice.

With regard to the appropriateness of demographic variables for the food market, a review of 20 relevant studies[5] drawn from various disciplines, including agricultural economics, applied economics, physical anthropology, clinical nutrition, and mathematics and statistics, was conducted. Results of these studies relating to Britain and Taiwan will be discussed first, followed by those in other countries.

Two food choice studies related to Britain were noted. Whichelow, Erzinclioglu and Cox (1991) found that there is a north/south divide in eating habits, suggesting the relevance of geographic variables in the food market context. Silver (1995) used consumer panel data and identified the baby food market segments by demographic variables.

In Taiwan, Chu (1998) undertook a survey in three urban cities and discovered significant effects of demographics on vegetable consumption. Eaters of organic vegetable are characterized by young age, high education level, and employment in public, military or education sectors. Eaters of water planted vegetable are characterized by young age and employment in

other than public, military or education sectors. Eaters of soil planted vegetable are older, less educated, and housewives. Chang (1996), by using convenience sampling that generated approximately 250 responses, found that the fresh tuna market in Taipei could be segmented by education level and family income. Wang (2000) interviewed approximately 440 coffee drinkers in coffee chains of Taipei, and discovered that they are mainly female, aged in twenties, single, and of tertiary education level. On the other hand, Li (2000) found that, among teenagers aged 13 to 17, the male and those living in village or near mountain are more likely to pursue traditional diet, while the female and those living in urban areas are more likely to take a controlled diet. So these studies, though hardly representative of the population, provide evidences for demographic effect on food choice in Taiwan.

Such evidences can also be found in Europe. Kfam et al. (1991) used Dutch National Food Consumption Survey data, and concluded that lower socioeconomic status is associated with heavier coffee consumption and skipping breakfast, while people from higher socioeconomic status are more prone to take more nutritional supplements and alcoholic drink, but consume less fat. In Italy, Dono and Thompson (1994) found that demographic variables account for substantial changes in meat consumption patterns. Lennernas et al. (1997) undertook a pan-European survey involving the 15 European Union member states, and found that major determinants of food choice vary by demographic groups. They surmised that demographic variables seem to exert stronger effects on perceived influences of food choice than country culture. Although this supposition lacks solid backup evidence, it serves as a useful reference because of its

attempt to assess the relative strength of demographic variables and national culture within the European food market context.

In the US, Ramezani, Rose and Murphy (1995) used the Household Food Consumption Survey data and concluded that price, income and demographic effects on food consumption are highly significant. Gao and Spreen (1994) also used the Household Food Consumption Survey data, and identified a number of factors of meat demand. These include, among others, ethnic background, employment status of female head of household, household size, region, urbanization, and the proportion of food expenditure on away-from-home consumption. Nayga (1998) turned to prepared food products, and identified an array of variables, including age, race, education, income, number of earners, household size, region, presence of children, and seasonality, that influenced the expenditure on these products. Mathios (1996) used supermarket scanner data and identified differences across demographic groups in their propensity to purchase high-fat unlabelled products, even allowing for effects of price and sales promotion. Yen, Jensen and Wang (1996) also found that egg consumption was influenced by an array of demographic variables, including gender, age, race, ethnicity, education, region, and urbanization.

So there is ample evidence of the relationship between food choice and demographic variables. This should be partly attributable to the product-specific nature of consumer purchase process. Food choice, in contrast with the choice of other products/services such as clothing and financial services, is a routine and low involvement decision, in which consumers act without forming well defined attitudes prior to purchase (Goldsmith, Freiden and Henderson 1997). So attitudinal variables are likely to exert lesser impact on

low involvement products than high involvement products. This increases the relative importance of demographic variables in the food choice process. Davis and Worrall (1998) also noted that 'demographic characteristics play a large part in determining food purchases. In particular, household budgets, family life-cycle stage, consumer age, socio-economic class, gender, geographic location, education, seem to have widespread effects'.

4.6 Choice of segmentation techniques

There are four broad categories of segmentation techniques: a-priori descriptive, a-priori predictive, post-hoc descriptive, and post-hoc predictive (refer to Chapter 2). In this study, the types of target segments have been determined before data analysis begins. These are users or nonusers of a particular retail format, and heavier or lighter users of an array of food products representing a particular consumption trend. Therefore, a-priori techniques are more appropriate than post-hoc techniques. On the other hand, as there is a target to be segmented on the basis of a set of independent variables, predictive techniques are preferred (SPSS 1998).

4.6.1 A-priori predictive segmentation techniques

Three common specific techniques in the a-priori predictive category have been noted in Chapter 2: contingency table, regression, and discriminant analysis. As seven broad segmentation variables are used in this study, so contingency table, which is inefficient in dealing with two or more segmentation variables simultaneously, is not an appropriate technique. Both regression and discriminant analysis are capable of estimating the simultaneous effects of multiple segmentation variables on the dependent variable. Between the two, the latter sets up stricter assumptions about independent variables, such as multivariate normal distribution with

identical population covariance matrices for each segment formed. This is an important reason for choosing regression rather than discriminant analysis in the study. Besides, there are a wider variety of types under the umbrella of regression analysis than discriminant analysis. Based on the nature of data to be analyzed, the most appropriate regression type can be chosen.

The conventional type of regression presumes that both dependent and independent variables are of integer variables. However, in this study, as noted in the preceding paragraphs, the concepts of retail choice (Spiggle and Sewall 1987) and participation decision (Young, Burton and Dorsett 1998) would be followed for choosing the measurement of segmentation targets. Retail choice is concerned with whether to use a store, while participation decision is about whether to purchase/consume a product. Using these concepts signifies that the nature of data so obtained for the dependent variables, if not further refined, is binary rather than integer. Such situations cannot be studied with ordinary regression, because doing so would violate several assumptions. The key problem is that the error term of a discrete variable follows the binomial distribution instead of normal distribution, thus invalidating all statistical testing performed in regression (Hair et al. 1995). Cox and Wermuth (1992) warned that taking the binary dependent variable into standard regression analysis greatly diminishes the effectiveness of the coefficient of determination.

The family of regression analysis provides a number of unconventional regression types for dealing with situations not suited to the conventional type of regression. In general, these unconventional regression types lift the restriction that all the variables are integer variables. Two such non-conventional regression techniques are logistic regression and Poisson

regression. The former allows for the use of dependent variables that are binary, and so is suitable for the analysis of *retail choices* as in the retail format part of this study. The latter is specifically suited for dependent variables that are count number, and therefore is chosen for the analysis of a count of *participative decisions* as in the consumption trend part of the study. What follows is a discussion of these two segmentation techniques.

4.6.2 Logistic regression

There are different perceptions of the logistic regression technique among statisticians. Hair et al. (1995) termed it as a linear probability model. Christensen (1997), on the other hand, viewed the technique as 'modelling the interactions in two-dimensional tables'. In spite of such perceptual differences, the equation format of the technique is always that the dependent variable is categorical in nature, and the independent variables can be either metric or non-metric.

To quantify the effects of the independent variables more fully, logistic regression does not predict just whether an event occurred or not (zone or zero), but instead predicts the probability of an event occurring (any value from zero to one). In order to define such a relationship bounded by zero and one, logistic regression uses an assumed relationship between the independent and dependent variables that resembles an S-shaped curve. At very low levels of an independent variable, the probability approaches zero. As the value of the independent variable increases, the probability climbs up the curve. But then the slope starts decreasing so that at any level of the independent variable, the probability will approach one but never exceed it. This unique feature of the assumed relationship requires a somewhat different approach in estimating the model parameters. The approach taken

is the maximum-likelihood method, by which the parameters that mostly likely lead to the observed results are selected. This selection process has to undergo an iterative algorithm because of the non-linear nature of a logistic regression model. Hair (1995) suggested that employing the maximum-likelihood method necessitates different ways in assessing a logistic regression model, such as the classification table and Hosmer-Lemeshow goodness-of-fit test.

Logistic regression is in a sense an extension of the conventional type of regression. For instance, both of them are based on a measure of correlations, which represents only the linear association between variables. Therefore, the assumption of absence of multicollinearity, which pertains to conventional regression analysis, also applies to logistic regression. This assumption has been a particular concern for Christensen (1997), who contended that correlations among independent variables, if exist, can make interpretations of logistic regression coefficients almost impossible. Under such a circumstance, he suggested checking not only pairwise correlations, but also partial correlations among variables.

In addition to the assumptions adapted from the conventional type of regression, there are three other criteria that particularly apply to logistic regression. First, skewness is generally not a problem for conventional regression analysis, but the iterative methods used for maximum likelihood estimation of logistic regression parameters may be affected (Freeman 1987). Therefore, users have to ensure that the variables in their logistic regression model are not unduly skewed. Second, Freeman (1987) suggested that the rate of missing values of each variable should not be unduly high. Otherwise, the logistic regression output has to be interpreted with great

caution. Third, Hosmer and Lemeshow (1989) reminded users to make sure that the contingency table does not contain a frequency of zero, and there should not be a collection of covariates that completely separates the outcome group.

If satisfying all these assumptions and criteria, a hypothetical logistic regression model may be developed. Its typical form appears like the following equation (Norusis 1993):

Probability (event) = e^Z / $(1+e^Z)$ *or* 1 / $(1+e^{-Z})$ *where* $Z = B_0+B_1X_1+B_2X_2+\ldots+B_pX_p$; B_0, B_1, B_2 ... *and Bp are coefficients estimated from the data;* X_1, X_2 ... *and* X_p *are the independent variables; and e is the base of the natural logarithms, which is approximately 2.718.*

Although logistic regression is a very clever technique (Tacq 1997), it contains a number of inherent defects that users have to be aware of. For instance, the correct classification rate is often taken to gauge the degree of model fit. Presumably, a high rate of correct classification is taken as a proof that the model fits. Unfortunately, this may or may not be the case. On the one hand, the correct classification rate is sensitive to the relative sizes of component groups and will always favour classification into the larger group. This phenomenon is independent of the degree of model fit (Hosmer and Lemeshow 1989). On the other hand, the remainder of the correct classification rate - the misclassification rate - is not only a function of the degree of model fit, but also a function of the slope coefficient for the logistic regression model, which has nothing to do with the degree of model fit. The disadvantage of taking the correct classification rate for assessing model fit is that it reduces a probabilistic model where the outcome is measured on a

continuum, to a dichotomous model where the predicted outcome is binary. There is practically little difference between the values of 0.48 and 0.52, yet using a 0.5 cut-point will treat these two outcomes as markedly different.

The likelihood test, which produces –2 log likelihood values, is a popular measure of model fit in logistic regression. Yet this statistic may not be very specific about the individual components. A small value does not rule out the possibility of some substantial deviation from fit for a few observations. On the contrary, a large value is a clear indication of a substantial problem with the model.

Every statistical technique sets up an array of assumptions and criteria, and contains some built-up advantages and disadvantages. Considering the framework of segmentation work and the nature of data collected for this study, logistic regression is considered the most appropriate segmentation technique for the analysis of retail choice. Precautions with regard to ways in assessing a model, multicollinearity, skewness, rate of missing values, and complete separation of the outcome group will be taken during the analysis stage of this study.

4.6.3 Poisson regression

There are statistical cases where the dependent variable is a count number, such as the number of occurrence of a certain disease in a town or the number of patients in a clinic over a given time period. The distribution of a collection of these non-negative, integer-valued count numbers is always highly skewed and far from normal. Therefore, conventional regression analysis is not suitable. These count numbers are not categorical, and so logistic regression technique is also not appropriate.

The standard model for count numbers is the Poisson regression model developed by, among many others, Nelder and Wedderburn (1972) and McCullagh and Nelder (1989). This model gets its name from the assumption that the dependent variable has a Poisson distribution, which was derived as a limiting case of the binomial by Poisson in 1837. Early applications, according to Cameron and Trivedi (1998), include the classical study of Bortkiewicz in 1898 that examined the annual number of deaths from being kicked by mules in the Prussian army.

The Poisson distribution is described in the following formulae:

$Probability(y=r) = \lambda^r e^{-\lambda} / r!$

where y is a variable being studied that can have only non-negative integer values

$r=0,1,2 \ldots$

λ *is the expected value, i.e. mean, of y*

$r!=r(r-1)(r-2)\ldots(1).$

A very important property of the Poisson distribution is that the mean and variance are equal. This leads to the following formulae:

$E(y) = var(y) = \lambda$

The parameter λ represents the dependent variable to be explained by a set of independent variables in a Poisson regression model. In order to ascertain that λ is never less than zero, as implied from the formulae of Poisson distribution above, for any coefficients of the independent variables, it is best expressed as a loglinear function of a set of independent variables in a typical Poisson regression equation shown below:

$log\ \lambda_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \ldots \_ \beta_k X_{ik}$

where subscript i is to allow the equation to be expressed across observations, i.e. $i=1,2,3,\ldots n$

β_0 is the intercept

β_1 is the coefficient of the independent variable X_1

β_2 is the coefficient of the independent variable X_2

and so on

Allison (1999) noted that the marginal distribution, i.e. distribution after ignoring any independent variable, of the dependent variable, is not necessarily Poisson distributed for applying the Poisson regression equation shown above. The author of this thesis also sought assurance from SAS Institute that as long as the dependent variable is a count number, the Poisson regression equation can be used.

There are a number of characteristics that specifically apply to Poisson regression (Cameron and Trivedi 1998). First is the law of rare events, which states that the pattern of count numbers will approximately follow the Poisson distribution if an event representing one count may occur anytime over the period but the probability of occurrence at any time of the period is small. Second is 'complete randomness' (Kingman 1993), which states that if the event counts in different time intervals are independent, the counting process is said to have independent increments. So in a sense the Poisson regression can be represented as a set of points on the time axis representing a random series of events occurring. Third, the pattern of Poisson data allows analysis of either count number or duration of time between successive occurrences of the event. Between the two, Dean and Balshaw (1997) noted that analysis based on count number is liable to loss of efficiency, i.e. reduction in the richness of the data. The fourth characteristic

is Poisson-stopped binomial, which treats the number of events as repetitions of a binomial outcome, with the number of repetitions taken as Poisson distributed.

A major weakness of Poisson regression stems from its built-in property that, for a given set of values on the explanatory variables, the variance of the dependent variable is equal to its mean. This means that the dispersion of values of the variable is equidistant. However, this equidispersion property is frequently violated in real-life data, in which the variance is often much higher than the mean, leading to the problem of over-dispersion. This is partly due to zero event counts, which are often dominant thereby leading to a skewed distribution, and unobserved heterogeneity in the individual experiences of the event in question, which means the actual variance exceeds the nominal Poisson variance even after independent variables are introduced.

Equivalently, one can say that over-dispersion occurs because there is no random disturbance term in the typical Poisson regression equation shown above. A disturbance term can produce a larger variance so as to reflect more of real life data, because it takes account of unexplained variance in the equation.

Over-dispersion, though not biasing the regression coefficients, will lead to underestimates of the standard errors and overestimates of chi-square statistics. This may result in an erroneous statistical result. The problem, which is potentially serious (Allison 1999), will be empirically evaluated and solved in the analysis stage of the study.

4.7 Choice of data sources

This study is linked to ideas of consumer research, because the basic object of analysis is the individual consumer. Consumer research can be broadly divided into theoretical and effects application (Calder, Phillips and Tybout 1981). The former is interested in the generalizability of ideas, i.e. construct validity in the broad sense (Cook and Campbell 1979) and less with the generalizability of data patterns or effects. The latter, on the other hand, does not need to understand exactly why a particular manipulation in an experiment has a certain effect, but must be able to confidently state that a similar manipulation would produce a comparable effect.

These two types of consumer research require different approaches to sampling. Theoretical researchers should employ homogeneous, and therefore non-representative, samples for operationalizing the constructs in the theory being tested. Effects application researchers should use representative samples in order to match as closely as possible between the sample and the population.

As this study does not emphasise too much how the chosen segmentation variables influence consumer choice in the retail system, but has to ensure that the result is representative of the population in Britain and Taiwan, representative sampling is required.

However, given the time and financial constraints, it is nearly impossible for the author to obtain representative samples on his own in both countries. Using secondary data that are representative of Britain and Taiwan for further analysis – secondary analysis - becomes an appropriate choice for the study.

4.7.1 Secondary analysis

Secondary analysis, defined as 'any further analysis of an existing dataset which presents interpretations, conclusions or knowledge additional to, or different from, those presented in the first report on the inquiry as a whole and its main results' (Hakim 1982), contains a number of inherent weaknesses that have to be taken into account.

One weakness is the distance separating the researcher from the context of the research for the secondary data. As a consequence, it is nearly impossible for the researcher to detect any possible error, such as interviewer and coding errors, made in the original survey.

Being distant from the context of the research may be less problematic for survey research than qualitative research, because the knowledge of the substantive area has been built into the process of survey design and data collection. However, designing structured questionnaires and training interviewers in standard procedures are only a part of the entire research process. There are many other hidden parts that are embedded in the institutional complexities upon which decisions are made at each stage of the research process. All these collectively are like a 'black box' that is hardly known by the secondary analyst. Yet this 'black box' influences the data that is 'produced' (Dale, Arber and Procter 1988). In this vein, Sapsford and Jupp (1996) looked to survey data as 'organisationally constructed'.

In order to counteract the weakness of 'distance', this study will examine with care the documentation relating to the secondary datasets obtained in order to gain as much knowledge as possible of the substantive area under

investigation. It is anticipated that this study can, accordingly, increase the knowledge of and obtain a greater insight into the original collection for using and interpreting the data in a better way.

This study uses four secondary datasets, all by representative sampling, which will be described below. However, as these datasets were produced by different institutions, the study as a whole is inevitably beset with 'house effects' (Kiecolt and Nathan 1985), which refer to inter-house differences in the contents and procedures of sampling survey. In response, this study will evaluate whether equivalence between different datasets is largely satisfied. Results are discussed in the next section.

Against the weaknesses noted above, a major strength of the secondary data used in this study is the quality of the data. British National Food Survey, one of the four datasets used, has been run for more than fifty years. This, as with other large-scale national surveys, usually produces high quality data derived from careful questionnaire design, fieldwork and methodological development (Dale, Arber and Procter 1988). Although the other three datasets used - British Where People Shop Survey, Taiwan Retail Format and Food Consumption Survey, and Electronic Commerce Survey, are not so well established as British National Food Survey, they have been successfully implemented through a network of expertise that is hardly achievable by an independent researcher. Therefore, using these Surveys means that the study has been benefited from all these survey infrastructure and expertise for itself.

The nature of this study, covering two countries, two types of consumer choice (where to shop at and what to shop for) and two time periods,

demands quite substantial amount of time for the analysis. Access to appropriate secondary datasets allows for the allocation of more study time and effort to considering more closely about the substantive issues of the study, rather than dealing with the methodological and practical problems of data collection (Hakim 1982).

Reports containing descriptive statistics, such as means and frequency distribution, of data from each of the four datasets used are available. For example, the reports for British National Food Survey provide a set of tabulation of the results, which are mainly presented in terms of average expenditure or consumption per person per week. Approximately 200 food groups are covered, each of which showing expenditure or consumption averages for 'all households' and for households classified on the basis of each considered variable. Concerning the format of these reports, in the case of British Where People Shop Survey, Taiwan Retail Format and Food Consumption Survey, and British National Food Survey, such reports are in printed format. In Electronic Commerce Survey, the report is in Microsoft PowerPoint format on the website. Because of the long history of British National Food Survey, a number of ad hoc publications using the Survey data were made. For example, Lund and Derry (1982) used the Survey data to assess the influences of a set of household characteristics on household food consumption. All these reports and publications are helpful for this study because they can be used to cross check the preliminary descriptive analysis of the study. This can safeguard against the possibility of misinterpreting the dataset and consistently mixing up the placement of different variables in the dataset that will lead to incorrect results.

In addition, using these secondary datasets shows a way through which to enquire about data handling (Kiecolt and Nathan 1985). People handling British People Shop Survey were accordingly contacted. This helps to develop a greater understanding of how to analyse the data.

So comparing between the strengths and weaknesses of using the four secondary datasets, the former are likely to outweigh the latter. The greatest potential weakness seems to be non-equivalence of data. This will be assessed in the next section. If there is any adverse effect stemming from the weakness that cannot be eradicated, this study will specify such an effect and qualify the results accordingly (Armer 1973). The idea is that as long as the nature of the samples is understood, any discrepancies are minimised and fully reported, and they have a commonality of focus, certain kinds of comparisons can be made (Frey 1970).

4.7.2 Datasets

4.7.2.1 British Where People Shop Survey

This Survey was conducted by Healey & Baker, which is involved in the real estate business of international scale. The company conducted an omnibus 'Where People Shop' Survey[6] across eleven European countries, including Britain, to serve its retail clients. The survey focuses on behaviours and opinions of shopping with particular regard to the food market. Data were collected in 1998.

The sampling frame of the Survey is the Postal Address File, which is a frequently updated record of all addresses in Britain recognized by the Royal Mail. The Survey adopted a two stage stratified random sampling design. The primary sampling units used in the first stage are Local Area

Authorities. The secondary sampling units in the second stage are enumeration districts, each of which is the smallest building block of census data made up of between 60 and 100 addresses. There are about 130 thousand enumeration districts in Britain. A disadvantage is that as enumeration districts are based on census data, they are liable to obsoleteness approaching the end of a decade (Fairlie 1993). The Survey, conducted in 1998, used data about enumeration districts that were seven years old because they were collected in 1991 census. Fortunately, large-scale migration between regions in Britain was not reported in 1990s. Therefore, data about enumeration districts used for the Survey should not lead to serious problem in sampling representativeness.

In the first stage of the Survey, 210 Local Area Authorities were randomly selected with the probability of selection proportional to population size. In the second stage, one enumeration district was randomly selected from each Local Area Authorities. To further increase the representativeness of the sample, the ACORN system[7] is used to guide the selection of enumeration districts.

Computer assisted personal interviewing was used during the fieldwork process. Interlocking quota controls are set up for gender, age and working status, so that the sample was nationally representative in terms of these three variables, besides region. The number of respondents is 623, each of whom is a main/joint shopper aged 16 or above in the household.

4.7.2.2 Taiwan Retail Format and Food Consumption Survey

Taiwan Retail Format and Food Consumption Survey was hosted by Council of Agriculture for helping policy-making in both public and private sectors.

It adopted a three stage stratified random sampling design. The sampling units used in the first stage are the twenty-three autonomous cities or prefectures, which are the highest-level local government districts. The sampling units in the second stage are the districts in the autonomous cities, and the cities, towns or rural regions in the prefectures. In the third stage, the lanes or villages, which are the lowest-level administrative units, were taken. Gender and age were used as the stratification variables, which help to further enhance the representativeness of the sample so obtained (Gilbert 1997).

The field work was conducted in 1998 and involved personal interviewing, adapted with a procedure of dropping in the questionnaire to be filled by the respondent for two weeks, and collecting and checking it at the spot later.

Prospective respondents were aged between 15 and 70 at the time of the Survey. If any such respondent refused to participate, an eligible person of eligible gender and age who was randomly chosen within a household next to the refusing household would be used as the substitute respondent. The number of respondents in the final sample is 1200.

4.7.2.3 British National Food Survey[8]

National Food Survey, implemented by the Ministry of Agriculture, Fisheries and Food of the UK, is a sampling survey of food consumption and expenditure of UK private households. Each household selected is requested to participate voluntarily for one week. Within each participating household, the person mainly in charge of domestic food affairs, called the main diary keeper, records all the food brought home for human use each day.

National Food Survey adopts a three-stage stratified probability sampling design. The first stage takes Local Authority Districts as the primary sampling units. Altogether 52 Local Authority Districts are incorporated at any time in each quarter of the survey year. The second stage is to randomly pick postal sectors within each of the selected Local Authority Districts. The third stage involves the selection of 18 delivery points within each chosen postal sector. The Small Users Postcode Address File is used as the basis to select delivery points by systematic sampling.

4.7.2.4 Electronic Commerce Survey

Electronic Commerce Survey was an omnibus survey conducted by a major market research company. The survey covers twenty-seven countries, including Britain and Taiwan, in the year of 2000. Altogether 31,627 respondents were interviewed across these twenty-seven countries. The sample in each country is nationally representative.

Depending on specific circumstances of each country, different survey methods might be adopted. For the British survey, face-to-face interviewing targeting at people aged 16 or above was used. In the case of Taiwanese survey, telephone interviewing with people aged between 15 and 84 was used. The sizes of the British and Taiwanese surveys are 2,240 and 1,000 respectively.

The whole of this Survey, together with a part of British Where People Shop Survey that has been described above, is concerned with shopping over the Internet. In this connection, a discussion of the use of survey instruments is

considered beneficial for a deeper understanding of the nature of the datasets used in this study.

Particularly in situations where the Internet and competing retail channels are the objects of a consumer survey, the Internet itself is a common survey instrument. This is adopted by, for example, Georgia Tech Graphics, Visualisation and Usability (GVU) Centre and Wharton Virtual Test Market (WVTM) for their continuous survey of Internet usage behaviour.

However, by using the Internet as a survey instrument, respondents are confined only to people having access to the Internet. The Internet survey method obviously suffers from sample distortions, which make confident generalization of corresponding results impossible (Nie and Erbring 2000).

Nie and Erbring (2000) tried to use a better sampling method for their study. They adopted a methodology developed by Inter-Survey Incorporation based in the US. This involves taking a national sample randomly from the telephone directory, and then supplying each individual so taken with a WebTV settop box with free Internet access and e-mail accounts. Responses are collected only from those participants who had Internet access prior to and independent of the WebTV access supplied. This method, though more representative in the sample selection stage, is still non-representative by excluding those people who don't have Internet access prior to the survey.

This study uses datasets that all adopt the more traditional method of person-to-person survey. Although the method incurs a higher cost of time and money, the sample taken in this way can be generalized to the general population with much greater confidence than an Internet-survey sample.

This is especially important for this study, which needs samples representative at the country level.

4.8 Choice of targets for equivalence diagnosis

The preceding section noted that the four datasets used in this study were produced by different institutions, which renders the possibilities of non-equivalence in sampling, construct and measure. This section checks against these possibilities. Sampling design and sampling unit are chosen as targets for sampling equivalence diagnosis. With regard to construct equivalence diagnosis, three targets – retail formats, consumption trends, and segmentation base – have been selected. Concerning measure equivalence, retail choice and participation decision are the foci of diagnosis.

4.8.1 Sampling equivalence

4.8.1.1 Sampling design

The designs of the four Surveys are different in a number of aspects, such as the number of stages of stratification (if any), the stratification variables used (if any), the number of respondents, and the required characteristics of respondents. For example, between British 'Where People Shop' Survey and Taiwan 'Food Retail and Consumption' Survey, the former used two stage stratified random sampling design, while the latter adopted three stage stratified random sampling design. The British Survey used gender, age, and working status for quota control, but the Taiwanese Survey used only gender and age for the same purpose. The British Survey covers 623 respondents all of whom were aged 16 or above, while the Taiwanese Survey contains 1200 respondents aged from 15 to 70.

Nevertheless, in terms of the sampling design, the four Surveys are considered generally suitable for comparison and aggregation purposes. It is because they share the same key broad phenomena of sampling design. All of them are nationally representative in theory, and were conducted within acceptable time frames (Malhotra, Agarwal and Peterson 1996). Moreover, the required characteristics of respondents that are different between Surveys will be re-coded, so that groups of respondents by any of these characteristics are readily comparable and combinable. Malhotra, Agarwal and Peterson (1996) noted that it is not essential for the sampling designs of countries involved in a cross-national marketing research project to be the same in every detail. For example, in a study comparing perceived risk and brand loyalty between countries, Verhage et al. (1990) used a telephone directory-based random sample for the US, a judgmental sample followed by random selection of households in Mexico, a judgmental sample followed by a store-intercept technique in Thailand, and convenience and snowball sampling in Saudi Arabia.

The next sub-section will discuss the issue of sampling unit. It will be shown that three of the four Surveys – British Where People Shop Survey, Taiwan Retail Format and Food Consumption Survey, and Electronic Commerce Survey, pass the equivalence test for this issue, but British National Food Survey does not.

4.8.1.2 Sampling unit

Among the four Survey datasets used, three were collected at the individual level. The only exception is British National Food Survey, whose sampling unit is at the family/household level. Respondents in that Survey provided data on food purchase that was not just for themselves, but also for their

respective family/household members. This may be problematic if the segmentation variables used are not of family/household level.

Throughout the four Survey datasets, six intra-country segmentation variables are used[9]. Three of them are family/household-level variables, i.e. per capita family income, household size, and region of residence. The remaining three are individual-level variables, i.e. gender, age group, and occupation.

As the purchase is made at the family/household level in British National Food Survey, relating the purchase to household-level variables is generally fine. Yet relating to individual-level variables is sometimes not appropriate. For example, the respondent may purchase ready meal for himself/herself, but there is always a possibility that the purchase is based on other household member's request. In that case, the respondent's personal characteristics (individual-level variables) are not logically relevant to the purchase decision. In this vein, Young, Burton and Dorsett (1998) noted that ' the composition of the household will affect preferences (purchase preferences) as a result of the different physiological and psychological needs of individuals of different ages and gender'.

This problem is probably greater now than in the past. Previously, it could be reasonably conjectured that all the foods purchased were consumed by all the members in the household. However today what an individual eats at home does not always come from the household food basket (Yeomans 1991).

To circumvent the problem, this study will extract a subset that comprises only single adult households with or without children, from British National Food Survey data. Extracting such a subset for analysis is based on the belief that the linkage between the personal preferences of the respondent and corresponding household purchases is more direct for single-adult households than multiple-adult households (Young, Burton and Dorsett 1998).

However, these single-adult households are quite likely to be significantly different from the whole British National Food Survey sample in terms of personal characteristics and food consumption habits. So using these households to represent the British population and compare the results so obtained to the Taiwanese national sample[10] is liable to error.

As using either the total household sample or the single-adult household sample contains problems, this study will firstly compare the personal characteristics between the two samples, so as to identify, in terms of these personal characteristics, where and to what extent discrepancies occur. Then, this study will conduct analysis for each of the two samples. Results of such 'twin' analyses presented side by side should be less subjective than results of analysis of only one of the samples.

4.8.2 Construct equivalence

Construct equivalence, which is concerned with whether the construct being studied is equivalent between countries, is a fundamental issue to be tackled in any cross-national comparative studies. As Sekaran (1983) noted, 'the perils of ignoring construct equivalence are formidable and warrant a serious and thorough analysis of such issues'. There are three distinct

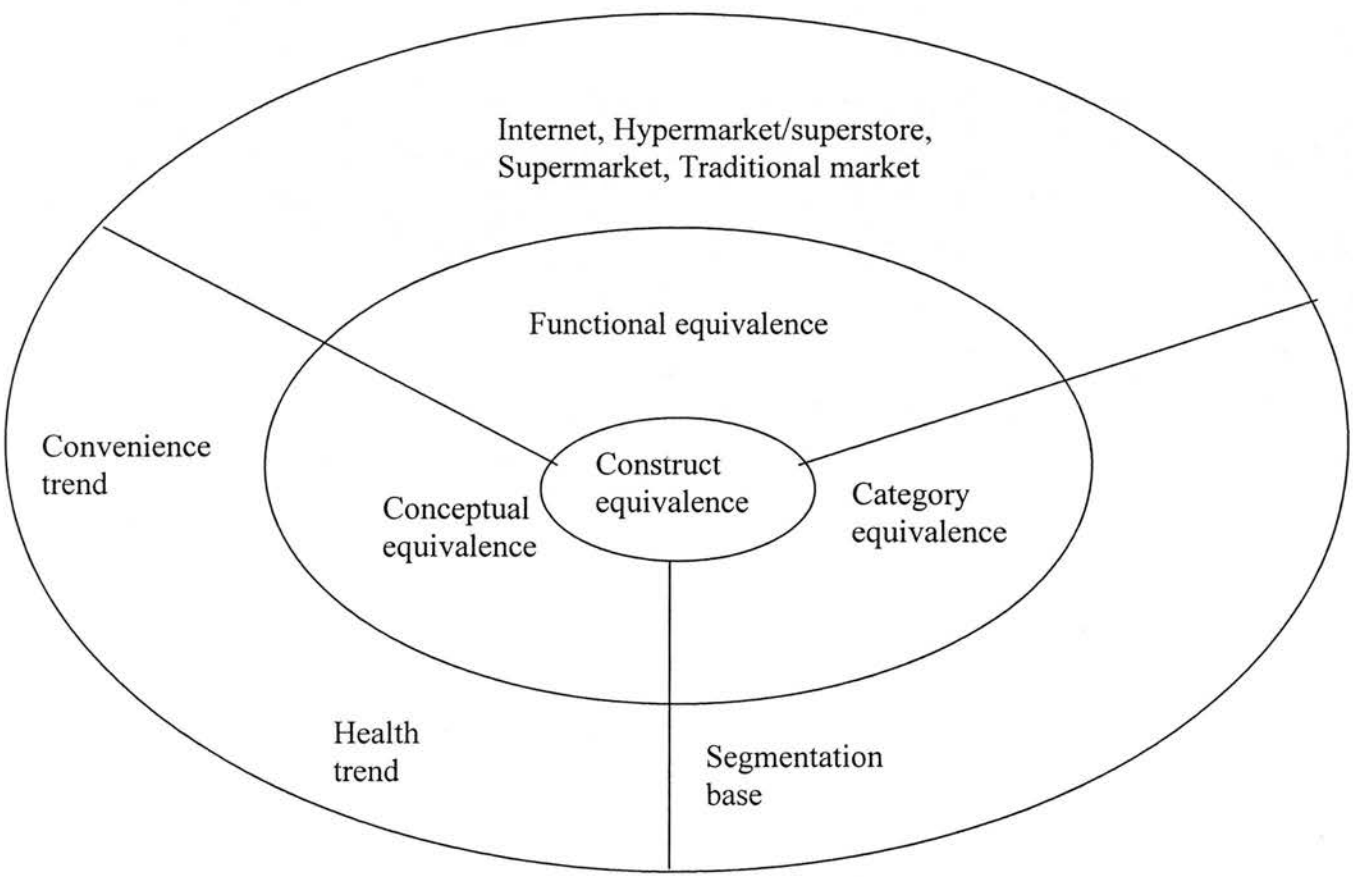
aspects of construct equivalence: functional equivalence, conceptual equivalence, and category equivalence.

Functional equivalence, first addressed by Berry (1969), refers to whether the objects, concepts or behaviours being examined have the same function in the countries covered. Craig and Douglas (2000) illustrated that bicycles are often regarded as a vehicle for recreation in the US. In the Netherlands, bicycles are heavily used an important mode of transport. This will pose an analytic problem if bicycle use is compared between the US and the Netherlands without prior measures to address the functional non-equivalence. Conceptual equivalence, on the other hand, assesses whether people of a country have the same conceptualisation of an object or attitude as people of another country. These two perspectives of construct equivalence actually represent viewing the same thing from two different levels – macro-based or micro-based. Functional equivalence takes a macro-based level. Conceptual equivalence, on the other hand, focuses on how micro-based individuals interpret objects, stimuli or behaviour being examined, and whether these interpretations exist or are couched in similar manners across countries. Finally, category equivalence is concerned with whether the same classification scheme of objects being studied can be used across countries.

Chapter 3 noted different definitions of the same retail format between Britain and Taiwan. This increases the suspicion of whether the same retail format provides the same main function across the two countries. This sub-section will assess this important aspect of construct equivalence for the Internet, the hypermarket/superstore, the supermarket, and the traditional market. On the other hand, convenience-orientation and health-orientation

are abstract concepts. Therefore, the issue of conceptual equivalence is considered the most important for examining the construct equivalence of these consumption trends. Finally, the segmentation base comprises six intra-country demographic variables in the study. All of them involve some form of categorization, and therefore category equivalence is considered the most relevant issue of these variables. Figure 4.3 summaries the targets and the aspects of construct equivalence to be diagnosed.

Figure 4.3 – Construct equivalence – its aspects and corresponding targets to be diagnosed



4.8.2.1 Retail formats

The Internet provides a virtual place for shopping. Yet it also provides some other functions, mainly communication, information search and

entertainment. Therefore, caution has to be taken for ensuring comparisons on the same functional basis between countries. As all the Internet-related Surveys in both Britain and Taiwan used in this study, including British Where People Shop Survey, Taiwan Retail Format and Food Consumption Survey, and Electronic Commerce Survey, included questions specifically about whether respondents used the Internet for the purpose of shopping within a prescribed period, functional equivalence is assured.

The hypermarket/superstore, the supermarket and the traditional market are some of the most widely used brick-and-mortar retail formats for shopping in both Britain and Taiwan (Table 4.1). However, people may shop at a particular retail format with different motives between countries. In the usual case, people shop because they get an idea of which products to buy, from which they decide where to go for these products (McGoldrick 1990). Yet people, in aggregate, do not 'shop for' purchasing things only. They may also 'shop around' in a retail setting (Falk and Campbell 1997), and may view shopping as an opportunity to become free from the daily routine, or to see new items and obtain new ideas, or to get stimulation through light, colours, sounds, scents and product handling (Tauber 1972). Additionally, shoppers at traditional markets in Taiwan may have a motive of enhancing their social life through communicating with sellers (Liao 2000c).

Acknowledging the multi-faceted motives of shopping, each of the three retail formats mentioned above are still functionally comparable between Britain and Taiwan for two reasons. First, across the two countries, all these retail formats are important places for 'shopping for' purchasing things. Even in Taiwanese traditional markets, 'shopping for' still outweighs 'enhancing social life' as the main motive for shopping. According to Xie's

(1995) survey in Taiwan, the traditional market is most patronized by people perceiving that, in this retail format, shoppers can choose, bargain, get fresher products, benefit from a sense of product uniqueness, and get closer relationship with sellers. Four of these five perceived advantages are related to 'shopping for', and only one is about 'enhancing social life'.

Second, the major function of each of these three retail formats is similar between the two countries. In the case of the hypermarket, the superstore and the supermarket, although Table 4.4 and Table 4.5 address different issues of these retail formats, a combined look at both provides some hindsight into functional equivalence of them. People in Taiwan found that 'price', 'variety' and 'parking' are the strong attributes of the hypermarket/superstore. They are therefore likely to use the format for major less frequent 'stock-piles' or primary (weekly) shop, as in Britain, because price is lower, variety is greater, and they can load the bulk purchases into their cars parked nearby. Liao (2000a) noted that in terms of customers' one-stop shopping need, the hypermarket/superstore is found to be the most satisfying retail format. On the other hand, the transportation advantage of Taiwanese supermarkets makes them a good place for secondary shop as in Britain, and the relatively longer opening hours leads them to serve shoppers' top-up needs well.

Table 4.4 - Functions of the hypermarket, the superstore and the town centre supermarket in Britain

Format	Major less frequent 'stock-piles'	Primary (weekly) shop	Secondary shop	Top-up shop	Specialist shop
Hypermarket	√	√			
Superstore		√			
Town centre Supermarket			√	√	

Source: adapted from Coopers & Lybrand (1996b)

Table 4.5 – The best performing retail format by attribute in Taiwan[1]

Format	Transportation	Price	Variety	Parking	Opening hours
Hypermarket/ superstore		√	√	√	
Supermarket	√				√

[1] although this study is based on non-probability samples in Taichung city of central Taiwan, results so drawn should be quite generally applicable to Taiwan's population, because the study is more of a theoretical than an effects-application consumer research, and Taichung city is not exceptional compared to other parts of Taiwan
Source: Xie (1995)

In the case of the traditional market, traditional markets in both Britain and Taiwan provide the same main function – fresh food selling. In this regard, Kirk, Ellis and Medland (1972) classified a wide range of merchandise that is suitable for selling in a British traditional market. This covers food, apparel, containers, textiles, small-sized electrical goods, ironmongery, other hardware, toilet goods, stationery, antiques, and second-hand goods, among which food, particularly fresh food, is the major type of merchandise. Kirk, Ellis and Medland (1972) estimated that, in early 1970s, traditional markets accounted for approximately 2% of total retail sales, but would have accounted for at least 15% of total retail sales if only fruit and vegetables had been considered. In Lancashire, where fresh food selling was even prominent, the percentage may even be as high as 30%. Whilst the share of fruit and vegetables accounted by the traditional market has fallen during the last thirty years, these products are still major product groups being traded within. The approximately corresponding sales pattern of traditional markets in Taiwan is shown in Table 4.6. As shown, fresh food, including red meat, poultry meat, seafood, vegetable, and fruit, occupied more than half of the total number of traditional market stalls in Taiwan.

Table 4.6 – Number of stalls of different merchandise types in Taiwanese traditional markets in 1999

Merchandise type	Number of stalls	Percentage
Red meat	5,852	11.53
Poultry meat	3,013	5.94
Seafood	5,955	11.73
Vegetable	7,881	15.53
Fruit	3,781	7.45
Cereal	1,028	2.03
Flower	502	0.99
Groceries	4,638	9.14
Non-food products other than groceries	4,886	9.63
Ready to eat food	4,749	9.36
Others	8,478	16.71
Total	51,169	100.00

Source: Ministry of Economic Affairs (2000)

4.8.2.2 Consumption trends

This study assesses convenience and health trends in the food market. Food products perceived as convenience-oriented or health-oriented are different in context between countries. Even people in the same country may have different perceptions of what are counted as convenience-oriented or health-oriented food products. In order to ascertain the status of construct equivalence, quite a wide range of food products that are considered convenience-oriented in Britain, health-oriented in Britain, convenience-oriented in Taiwan, and health-oriented in Taiwan respectively is chosen. Then small-scale surveys targeting at British and Taiwanese people respectively were undertaken. These surveys aimed at screening food products and keeping only those for which at least 70% of respondents agreed as convenience/health-oriented. The sample of British people was drawn from students ordinarily resident in Britain and studying in Edinburgh. The sample of Taiwanese people came from Taiwanese students who were studying in Edinburgh at the time of the survey. The survey was

taken in early 2001, and the numbers of respondents are 30 and 16 respectively for the British and the Taiwanese samples.

Results of these surveys are shown in Table 4.7, Table 4.8, Table 4.9, and Table 4.10. Overall there are 19 convenience-oriented food products and 11 health-oriented food products for Britain, and 7 convenience-oriented food products and 7 health-oriented food products for Taiwan that pass the 70% cut-off test.

Table 4.7 – Choice of convenience-oriented food products in Britain

Product	The product is convenience-oriented		
	Agree	Neutral	Disagree
Bacon and ham, cooked, including canned	90.0	10.0	0.0
Cooked poultry, not purchased in cans	73.3	23.3	3.3
Takeaway cooked poultry	100.0	0.0	0.0
Other cooked meat, not purchased in cans	73.3	23.3	3.3
Other canned meat and canned meat products	70.0	26.7	3.3
Meat pies, ready to eat	90.0	10.0	0.0
Sausage rolls, ready to eat	96.7	3.3	0.0
Frozen burgers	40.0	40.0	20.0
Frozen meat pies, pastries and puddings	36.6	40	23.3
Other frozen convenience meats	43.4	36.7	20.0
Pate	70.0	20.0	10.0
Delicatessen type sausages	80.0	13.3	6.7
Meat pastes and spreads	76.7	16.7	6.6
Meat pies, pasties and puddings	80.0	16.7	3.3
Takeaway meat pies, pasties and puddings	93.3	6.7	0.0
Ready meals	96.7	3.3	0.0
Takeaway ready meals	89.7	6.9	3.4
Fish, cooked	73.3	26.7	0.0
Salmon, canned	46.6	43.3	10.0
Other canned or bottled fish	33.4	43.3	23.3
Fish products, not frozen	46.7	20	13.4
Takeaway fish products	72.4	13.8	13.8
Frozen convenience fish products	26.6	53.3	20.0
Peas canned	63.4	30	6.7
Baked beans in sauce	93.1	6.9	0.0
Other canned beans and pulses	70.0	20.0	10.0
Canned vegetables other than pulses, potatoes or tomatoes	60.0	30.0	10.0
Frozen chips and other frozen convenience potato products	60.0	30.0	10.0
Soups, canned	90.0	10.0	0.0
Soups, dehydrated and powdered	56.7	23.3	20.0

Table 4.8 – Choice of health-oriented food products in Britain

Product	The product is health-oriented		
	Agree	Neutral	Disagree
Yoghurt	90.0	10.0	0.0
Fromage frais	51.7	34.4	13.8
Fully skimmed milk	73.4	10.0	16.6
Semi and other skimmed milk	83.3	16.7	0.0
Reduced fat spreads	73.3	23.3	3.3
Low fat spreads	73.3	23.3	3.3
Vegetable juice	76.7	16.7	6.7
Bread, wholemeal, sliced	93.3	6.7	0.0
Bread, wholemeal, unsliced	90.0	10.0	0.0
Starch-reduced bread and rolls	69.0	27.6	3.4
Crispbread	53.4	40.0	6.6
Oatmeal and oat products	86.6	6.7	6.7
Muesli	86.7	3.3	10.0
Other high fibre breakfast cereals	86.7	6.7	6.7
Artificial sweeteners (expenditure only)	33.3	23.3	43.3
Soft drinks, low calorie, concentrated	43.3	30.0	26.7
Soft drinks, low calorie, unconcentrated	46.7	36.7	16.7
Low alcohol beers, lagers and ciders	20.0	36.7	43.3

Table 4.9 – Choice of convenience-oriented food products in Taiwan

Product	The product is convenience-oriented		
	Agree	Neutral	Disagree
Long shelf-life milk (including flavoured)	43.8	43.8	12.5
Canned mushroom	25.1	56.3	18.8
Canned minced meat	56.3	43.8	0.0
Canned fish	75.1	25.0	0.0
Ready to eat bean product in sweet paste	31.3	37.5	31.3
Broth	75.0	12.5	12.6
Soup powdered	81.3	18.8	0.0
Soup, pour in water and ready to eat	93.8	0	6.3
Frozen vegetable	43.8	43.8	12.6
Ready to eat rice product, cooking for reheat needed	62.5	31.3	6.3
Ready to eat rice product, no cooking for reheat needed	60.0	40.0	0.0
Ready to eat porridge, no cooking for reheat needed	66.6	26.7	6.7
Ready to eat porridge, cooking for reheat needed	56.3	37.5	6.3
Prepared meal pack	68.8	25.0	6.3
Three-in-one coffee	93.8	0	6.3
Three-in-one wheat flake	93.8	6.3	0.0
Malt, chocolate or cocoa drink, ready to drink (individual pack)	93.8	6.3	0.0

Table 4.10 – Choice of health-oriented food products in Taiwan

Product	The product is health-oriented		
	Agree	Neutral	Disagree
Fresh milk (including flavoured) (fat free or low fat)	75.0	12.5	12.5
Diluted fermented milk	31.3	56.3	12.6
Condensed fermented milk	76.1	15.9	8.0
Solidified fermented milk	81.3	18.8	0.0
Milk powder (low fat or fat free)	37.5	56.3	6.3
Egg roll (functional)	12.5	56.3	31.3
Breakfast cereal	75.0	18.8	6.3
Rice (calcium added)	68.8	25.0	6.3
Konjac	62.6	18.8	18.8
Egg (functional egg)	37.5	31.3	31.3
Safflower oil or olive oil	68.8	18.8	12.6
Soy sauce (low salt)	56.3	37.5	6.3
Vinegar (for drinking purpose)	56.3	31.3	12.5
Pure fruit and / or vegetable juice	87.5	6.3	6.3
Packaged water (ionic water)	25.0	50.0	25.0
Functional drink	12.5	50.0	37.6
Lactose drink	50.0	37.5	12.5
Fruit sour / vinegar drink	37.5	43.8	18.8
Soybean milk (lecithin)	68.8	25.0	6.3
Chicken essence (including vegetarian form)	50.0	43.8	6.3
Bird's nest	56.3	31.3	12.6
Turtle paste	37.5	31.3	31.3
Linchi	75.0	12.5	12.6
Lecithin	75.0	12.5	12.6
Other health food	43.8	37.5	18.8

4.8.2.3 Segmentation base

Six demographic variables – gender, age, occupation, income, household size, and region of residence – have been chosen, in aggregate, as the segmentation base for this study. There is no problem in category equivalence with regard to gender, age and household size, because categorization of each of these three variables is natural, as opposed to social in nature, and therefore is the same across countries.

Caution has to be taken for the occupation variable partly because a particular occupation may be valued differently between countries. In East Asian societies that are heavily influenced by Confucianism, the teacher is highly respected and commands a higher occupational status than some western countries such as the US. So there may be categorical non-equivalence if we place the teaching profession, separately from other professions, on the same level of hierarchy of occupation between these two types of countries. Fortunately, there are some board occupational terms, such as employer, clerical and manual, that are commonly used and similarly meant across many countries. This study uses these terms for establishing three board occupational categories: employer, manager or professional; clerical or manual employee; and economically non-active, which are considered taxonomically clear, mutually exclusive and equivalent at large across countries.

Care has also to be taken for the income variable. It is inappropriate to treat people earning the same level of income in Britain and Taiwan as the same, because the purchasing power levels are different between the two countries. This study categorizes income on a *comparative*, rather than *absolute*, basis. Respondents in a country are categorized into three equal percentile groups: higher income, middle income, and lower income, based on their income levels relative to those of other respondents of the same country. Respondents of an income group in a country are then comparable to respondents of the same income group in another country by the way of their position relative to all the respondents of their own country.

The 'region of residence' variable, in its original form, is not categorically equivalent because administrative regions are obviously different by

country. The study recoded this variable into only two categories: living inside the capital city and living outside the capital city.

4.8.3 Measure equivalence

Once construct equivalence has been explored and ascertained, the next move is to consider measure equivalence, which in brief is an operational definition of the construct. Three aspects of measure equivalence can be considered: calibration, translation and metric.

Calibration equivalence refers to the calibration system used in measurement of the construct. The system is usually in terms of monetary units, weights, volume, and distance. It can also be in terms of standards, such as product grading or product quality. Occasionally it can be in terms of perceptual cues, such as colour, shape or form, for measuring visual stimuli.

Translation equivalence is concerned with testing whether the research instrument translated in different languages can be understood and meant the same between respondents of each such different language. The issue of translation equivalence is much more crucial for abstract questions that factual questions.

Metric equivalence is the scaler or scoring equivalence of the measure used. This raises two concerns. First is about the specific scale or scoring procedure used to establish the measure. A procedure may be most effective in one country or culture than another. For example, Douglas and LeMaire (1974) found that whilst in the US, use of a five- or seven-point scale is usual, in other countries a ten-point scale may be more commonly used. Second is about the equivalence of response to a given measure in different countries.

This refers to whether a score obtained in one country has the same meaning and interpretation in another country, such as whether a position on a Likert scale has the same meaning in all countries. The issue of metric equivalence is much more crucial for more subjective measures such as attitudes and lifestyles than objective measures such as demographic characteristics.

As this study uses data arising from factual questions, including whether respondents used a particular retail format, whether they purchased/consumed a particular product, and their demographic characteristics, issues of translation and metric equivalence are not serious and considered not very important in the study. By contrast, there are two points about calibration equivalence that need to be assessed – calibration of retail choice and calibration of participation decision.

4.8.3.1 Calibration of retail choice

'Retail choice', referred to as whether the consumer uses or does not use the store, is chosen for calibrating the measurement of the Internet and retail formats in this study. Although universally a binary variable, 'retail choice' is not identically measured in substance between Surveys and countries because these Surveys were conducted independently by different institutions. In British Where People Shop Survey, 'retail choice' is defined as whether respondents use the retail format in question nowadays for shopping. In Taiwan Retail Format and Food Consumption Survey and Electronic Commerce Survey, 'retail choice' is defined as whether respondents used the retail format in the past month. It can be deduced that comparability of the same term in these two types of Surveys is subject to the condition that either a shopper in British Where People Shop Survey who uses a retail format nowadays for shopping usually uses it at least once in a

month, or a shopper in any of the two other said Surveys who has used a retail format in a particular month really uses it nowadays for shopping.

Although it is possible that a Taiwanese who happened to use a retail format in the survey month seldom uses it, or another Taiwanese who happened not to use a retail format in the month actually uses it nowadays, it is much more likely that having used a retail format in a month, including the survey month, is tantamount to using it nowadays for shopping. Xie (1995) found that 83.9% of respondents use traditional markets 'very often or often', which can be approximated to using them nowadays for food shopping. They also found that 72% of respondents use supermarkets in the same manner. These findings are similar to those of Taiwan dataset used in this study. Additionally, the retail choice of traditional markets shows signs of decrease over the years, including the period between 1995 (survey year of Xie (1995)) and 1998 (survey year of Taiwan dataset used in this study). Therefore, it can be confidently argued that the two definitions of retail choice, one for Britain and another for Taiwan, are very similar in substance.

4.8.3.2 Calibration of participation decision

'Participation decision', defined as the decision of whether to purchase or consume, is used to calibrate the measurement of consumption trends in this study. This is different in substance between the Surveys used in the study. British National Food Survey records the participation decision in terms of purchase, while all other Surveys are in terms of consumption.

British National Food Survey records purchases over a seven-day period. However, purchases do not necessarily mean consumption over the period, as these purchases may be wholly used to rebuild stocks for future

consumption. On the other hand, non-purchases do not always refer to non-consumption, because there may be cases where no purchase is made, but consumption through depleting the stocks still happens.

Fortunately this problem is considered not particularly serious, because the use of large sample size of around 6,000 in British National Food Survey should largely average out the discrepancies between purchase and consumption. As a result, purchase and consumption can be considered with confidence as synchronous to each other (Young, Burton and Dorsett 1998).

4.9 Choice of stage of approach to data analysis

This study adopts a three-stage approach to data analysis for cross-national consumer segmentation suggested by Craig and Douglas (2000). The three stages are, in a consecutive order, intra-country analysis, inter-country analysis, and pan-country analysis.

The first stage – intra-country analysis – attempts to identify any significant differences between people of the same country in the use of the segmentation target. Identification of any such differences, if any, is tantamount to successful location of market segments useful for marketing purposes. Comparison of such market segments across segmentation targets of the same nature, e.g. different retail formats, may provide further insight into the relative competitive position between these segmentation targets. Furthermore, comparison of market segments of the same segmentation target between countries may indicate the relative applicability of a set of segmentation variables to a country as opposed to another. Intra-country analysis is the operating mechanism of domestic market segmentation.

The second stage – between-country analysis – attempts to conclude whether there is any significant 'macro-based' difference in the use of a particular segmentation target between Britain and Taiwan. 'Macro-based' is referred to as that the level of analysis is *country*, rather than individuals or groups of individuals within countries. This kind of analysis, if covering a number of countries, contributes to international market segmentation at the macro-level.

Pan-country analysis – the third stage - serves the same purpose as between-country analysis, but with a different level of analysis. *Individual*, rather than country, becomes the focal point. Accordingly, pan-country analysis attempts to identify any significant 'micro-based' difference in the use of a particular segmentation target between countries. The advantage of using 'micro-based' rather than 'macro-based' approach is that there are some domestically-oriented variables, such as demographic variables used in this study, that are interwoven with the country variable in deciding whether the country difference exists, and if exist, whether it is greater than the domestically-oriented variables being used. So the micro-based approach is more in line with the real life, because whether an individual uses a product/service/idea usually depends on not only where he is, i.e. country variable, but also who he is, i.e. domestically-oriented variables. Pan-country analysis is an operating mechanism of international market segmentation at the micro-level.

This three-stage approach of data analysis is adopted for two main reasons. First, the approach suits the research objectives of this study, which aims to locate heavy user segments of each segmentation target being studied,

namely the Internet, the hypermarket/superstore, the supermarket, the traditional market, the convenience trend, and the health trend in Britain and Taiwan respectively, and more importantly to discern the effect of the country factor, relative to within-country demographic factors, on the internationalisation of these segmentation targets. Second, the final stage of the approach – pan-country analysis – essentially uses the regression technique. As discussed in the section on the choice of segmentation techniques, the nature of the data collected for this study points to the appropriateness of adopting some unconventional forms of the regression technique.

Although there is not much doubt about the choice of the approach to data analysis in this study, a question arises as to the choice of the stage of the approach for each segmentation target being studied. This is mainly because it is not always feasible to set up the data collected in a form ready for all the three stages of the approach to be accomplished.

The preceding sections have noted that the four retail formats being studied largely meet the criteria of equivalence between Britain and Taiwan, but the two consumption trends fail to meet some of these criteria. The most fatal one is that the consumption data for Britain were collected on a household basis, but those for Taiwan were surveyed on an individual basis. This disallows the accomplishment of some stage of the approach. Specifically, while the retail formats will get through all the three stages of the approach to data analysis, the consumption trends have to stop short of inter-country and pan-country analyses, because corresponding data for the two countries are not comparable and cannot be combined.

4.10 Chapter summary

Research design is essentially about making choices (Anderson and Alder 2000). During the course of research design particularly for this study, eight interdependent choices have to be determined. These include choices of countries, of within-country market context, of segmentation targets found in the market context, of the means of measuring these segmentation targets, of bases used to segment the segmentation targets, of segmentation techniques applied to work out a relationship between targets and bases so selected, of data sources needed for the work, of targets for equivalence diagnosis, and finally of the approach of analysis that matches the nature of the data collected.

With regard to the choice of countries, Britain and Taiwan are selected for conducting cross-national consumer segmentation research of their retail systems. The choice is supported by a range of methodological, academic, business and private reasons.

Concerning the choice of market context upon which segmentation targets are determined, the food sector has been chosen for a number of reasons. The first is that the food sector represents a substantial market size worthy of international marketing efforts in every part of the world. Second, as food intake greatly influences body health, understanding where people shop and what they shop for in the food sector could assists in social policy planning. Third, as the food sector generally needs a sophisticated physical distribution system vis-à-vis many other businesses, it is an appropriate choice because cross-national consumer segmentation is more likely to be part of a longer-term strategic activity.

In respect of the choice of segmentation targets, as pointed out in the earlier part of this study, four retail formats (Internet, hypermarket/superstore, supermarket, and traditional market) and two consumption trends (convenience and health trends) are selected. The decisions are based upon three considerations, including the market size, the market potential, and the internationalization potential.

As regards the choice of measurement of segmentation targets, Spiggle and Sewall's (1987) concept of retail choice, which is concerned with whether the consumer uses or does not use the retail outlet, is adopted for measuring consumer choice of retail formats. On the other hand, Fine, Heasman and Wright's (1996) idea of participation decision – whether to purchase or consume – is taken for measuring consumer adherence to a particular consumption trend.

Three major alternatives are available as the segmentation base for cross-national consumer segmentation. These include the demographic variable set, the lifestyle variable set, and the behavioural variable set. The first one is chosen for a number of reasons, namely the reliability issue, the rating based on Wedel and Kamakura's (1998) classification framework, and the evidence of relationship between demographic variables on the one hand, and consumer choice of retail formats and food products on the other hand.

A-priori predictive techniques of segmentation are considered appropriate as the decision on the choice of segmentation techniques for this particular study. Within a family of a-priori predictive techniques, the regression technique is chosen because of its less strict assumptions and having a number of unconventional types available for use. Considering the nature of

survey data used for this study, two unconventional types of regression – logistic regression and Poisson regression – are taken.

Representative sampling is required for consumer research that is of an effects application type, which must be able to confidently state that a similar manipulation would produce a comparable effect. This study falls into such a type of consumer research, because any result drawn from the samples should match as closely as possible with that drawn from the population. Given the time and financial constraints of this study, it is nearly impossible to obtain representative samples in Britain and Taiwan. Therefore, secondary data, other than primary data, which satisfies the criterion of representative sampling, is chosen as data sources. Accordingly, four national survey datasets are adopted, which include British Where People Shop Survey, Taiwan Retail Format and Food Consumption Survey, British National Food Survey, and Electronic Commerce Survey. The relative advantages of using these secondary datasets have been noted.

The next research design stage of this study is the choice of targets for equivalence diagnosis that arises from the possibilities of non-equivalence in sampling, construct and measurement because the four abovementioned datasets were produced by different institutions. Two aspects of sampling equivalence have been probed, including sampling design and sampling unit. Construct equivalence comprises three facets – functional equivalence, conceptual equivalence, and category equivalence –, which are examined respectively against three dependent or independent variable sets – retail formats, consumption trends, and segmentation base. Lastly, calibration equivalence, which is subdivision of measurement equivalence, is tested upon two measurements adopted in this study, i.e. retail choice and

participation decision. Results of the 'diagnosis of equivalence' identify only one problem, that the sampling unit is not equivalent between different datasets. Specifically, British National Food Survey has been conducted at the family/household level, while all the other Surveys have been carried out at the individual level. This necessitates some adjustment in research design as elaborated in the next paragraph.

The last stage of research design is concerned with data analysis. A three-stage approach to data analysis for cross-national consumer segmentation suggested by Craig and Douglas (2000) is adopted, because firstly it suits the research objectives of this study, and secondly it essentially uses the regression technique whose unconventional forms – logistic regression and Poisson regression – have been considered suitable for analyzing the data used in this study. However, given the non-equivalence of sampling units between British National Food Survey and all other Surveys as noted in the previous paragraph, not all the objects chosen in this study can get all the way through the three stages. Objects derived from British National Food Survey – consumption trends – cannot enter the last stage – pan-country analysis –, which necessitates a combination of data collected from Surveys of different countries.

Notes

[1] The participation decision and the expenditure decision are the specific terms used for the 'double hurdle' model (Young, Burton and Dorsett 1998). The former represents the first stage of typical two-stage consumer decision process. Provided the consumer participates, he/she will move into the second stage, the expenditure decision.

[2] Demographic variables in a strict sense are referred to the capture of vital characteristics of human population, such as gender, age, household/family size, family life cycle, marital status, race, nationality, and religion. Demographic variables in a broad sense extend to include socio-economic and geographic variables (Weinstein 1994).

[3] Using demographic variables on a macro basis refers to using them, such as gender distribution or age structure, on country/society level. Using demographic variables on a micro basis means using them on an individual level.

[4] As this thesis analyses retail choice on a format level rather than individual store level, the review is confined to studies of choice of retail formats.

[5] As this thesis is not involved in the study of food products on a brand level, the review is confined to consumer choice of generic food categories.

[6] An omnibus survey is very much the same as an ad hoc survey. The only exception is that the omnibus survey questionnaire, rather than being entirely used for one project, is shared by a number of projects, each with their own separate sub-questionnaire. These sub-questionnaires are usually on entirely different prospective respondents, and are linked together to form one composite questionnaire for facilitating survey administration.

[7] ACORN is an acronym for 'A Classification Of Residential Neighbourhoods', which is a demographic system designed by CACI, an international consultancy firm based in the US. Using the census data, the ACORN system classifies each enumeration district into one of 54 ACORN

types. ACORN types are derived from a series of multivariate analysis of census data, and are labeled by descriptors (e.g. Type 13:40 = Council Areas, Older People, Health Problems). These ACORN types are then combined into 17 groups and 6 categories. With the application of the ACORN system, random selection of enumeration districts is subject to matching the sample profile of ACORN groups within each standard region to the population profile of the region. This ensures a sample that is representative of ACORN category/group at a regional level and ACORN type at the national level.

[8] Observations for Northern Ireland of UK National Food Survey were deleted for this study so as to geographically match other datasets (Where People Shop Survey and Electronic Commerce Survey) that are confined to Britain.

[9] Only two intra-country segmentation variables – gender and age – are used in the Electronic Commerce Survey dataset, because the other four variables are not covered in the Survey.

[10] It was contemplated that only the single-adult households from the Taiwanese sample are used, so that like by like comparisons can be made. However, such contemplation was abandoned because single-adult households occupy a tiny 2.2% of the Taiwanese sample. The sub-sample size is therefore less than 30, which is too small to get any valid result.

Chapter 5 – Analysis and Findings

The latter part of the preceding chapter describes the data source and general approach to data analysis adopted in the study. This chapter will follow up on the data and approach, by probing into the variables extracted from the data, identifying possible data problems prior to analysis, setting up hypothetical regression models, and finally presenting the findings arising from the analysis. Conclusions drawn from these findings will be discussed in the next Chapter.

5.1 Variable coding

Table 5.1 shows the six demographic variables that will be used as the segmentation base of the study. Coding of these variables is the same as that which originally appears in respective datasets. They have to be recoded, so that they can be comparable and pooled for cross-national consumer segmentation.

Among the six variables, gender, age, and household size are factual data that are easily comparable between countries. So recoding of these variables, if any, is much easier than the other three variables.

Three categories are created for the occupation variable. These are 'employer, manager or professional', 'clerical or manual', and 'economically inactive'. The recoding of original occupation categories of each dataset into any of these three recoded categories is self-explanatory in Table 5.1. Although these recoded categories are still not perfectly comparable across

different datasets, the degree of imperfection is considered insignificant so that using these variables would not produce significantly biased results.

The problem with recoding the income variable is that different countries have different average income levels and different income distribution patterns. It does not make much sense to say that a person earning say £15,000 a year in Britain is comparable to a person earning the same salary in Taiwan. To solve this problem, England and Harpaz (1983) suggested using intra-country reference group comparisons. So this study uses three equal income percentiles within countries, i.e. households in the lower 0%-33%, middle 34%-66%, and upper 67%-100% of the income distribution. Each of these three income category groups in one country is comparable to the corresponding group in another country, on the basis of their income status comparable to other groups in the same country.

Geographical areas and administrative districts are generally unique to one country. One possibility of recoding these unique region categories is to identify the extent of urbanization in each such area or district. However, the definition of 'urban' varies substantially from country to country, depending largely on the population density. Craig and Douglas (2000) noted that in Japan, urban population is defined as a city with 50,000 inhabitants or more, but in Canada, places of 1,000 or more inhabitants are sufficient to be called urban area. In view of the impracticability of comparing between countries on the basis of urbanization, this study dichotomizes 'region of residence' variable into two categories – either living or not living in the capital city. It is conjectured that people living in different capital cities are comparable in terms of their residing in often one of the most important political, economic and cultural cities of their own countries.

The six variables are incorporated in three of the four datasets used for this study. In the 'Electronic Commerce Survey' dataset, only two of these six variables – gender and age – have been used. This dataset is used for cross-national consumer segmentation of the Internet across years, so as to develop a richer picture of comparison between the global technology dimension and the national culture dimension of such an important retail innovation. In this regard, analysis will be carried out with only gender and age representing the demographic variable set that will be compared to the country variable.

All the considered variables that have been recoded and therefore are ready for cross-national consumer segmentation are described in Table 5.2.

Table 5.1 – Set of uncoded variables extracted as the segmentation base for the study

Variable	Where People Shop Survey (Britain)	Retail Format and Food Consumption Survey (Taiwan)	National Food Survey (Britain)	Electronic Commerce Survey (Britain and Taiwan)
Gender	Male=1; Female=2	Male=1; Female=2	Male=1; Female=2	Male=1; Female=2
Age	Exact age	15-20=1 21-30=2 31-40=3 41-50=4 51-60=5 61-70=6	Exact age	Exact age
Occupation	Managerial/professional (including self-employed professional)=1 Clerical employee=2 Manual employee=3 Self-employed (excluding self-employed professional)=4 Retired=5 Unemployed/not economically active=6	Full time housewife=1 Employer or manager=2 Clerical employee=3 Manual employee=4 Unemployed=5 Full time student=6	Manager=1 Foreman/supervisor=2 Apprentice, etc. or employee not classified elsewhere=3 Self-employed without employees=4 Self-employed with employees=5 Not applicable (e.g. unemployed, retired)=6	
Income	(Annual household income) <£2500=1 £2500-£4499=2 £4500-£6499=3 £6500-7499=4 £7500-9499=5 £9500-£11499=6 £11500-£13499=7 £13500-£15499=8 £15500-£17499=9 £17500-£24999=10 £25000-£34999=11 £35000-£39999=12 £40000-£59999=13 £60000-£100000=14 >£100000=15	(Monthly family income) <=NT$20000=1 NT$20000-NT$30000=2 NT$30000-NT$40000=3 NT$40000-NT$50000=4 NT$50000-NT$60000=5 NT$60000-NT$70000=6 NT$70000-NT$80000=7 NT$80000-NT$90000=8 NT$90000-NT$100000=9 NT$100000-NT$110000=10 NT$110000-NT$120000=11 NT$120000-NT$130000=12 NT$130000-NT$140000=13 >=NT$140000=14	(Weekly net family income) Exact income in pence to the nearest ten pence, not known=999 99	
Household size	1=1 2=2 3=3 4=4 5=5 6=6 7=7 >=8=8	1=1 2=2 3=3 4=4 5=5 6=6 7=7 8=8 9=9 >=10=10	Exact number	
Region	Scotland=1 North=2 Midlands/East Anglia=3 South=4 Wales=5 London=6	TaipeiPrefecture=1 IlanPrefecture=2 TaoyuanPrefecture=3 HsinchuPrefecture=4 MiaoliPrefecture=5 TaichungPrefecture=6 ChanghwaPrecture=7 NantouPrefecture=8 YunlinPrefecture=9 ChiayiPrefecture=10 TainanPrefecture=11 KaohsiungPrefecture=12 PingtungPrefecture=13 TaitungPrefecture=14 HwalingPrefecture=15 PenghuPrefecture=16 KeelungCity=17 HsinchuCity=18 TaichungCity=19 ChiayiCity=20 TainanCity=21 TaipeiCity=22 KaohsiungCity=23	Greater London=1 The Metropolitan districts and the Central Clydeside conurbation=2 LAD with >=7 electors/acre=3 LAD with 3~<7 electors/acre=4 LAD with 0.5~<3 electors/acre=5 LAD with <0.5 electors/acre=6	

Table 5.2 – Set of recoded variables extracted as the segmentation base for the study

Variable	Where People Shop Survey (Britain)	Retail Format and Food Consumption Survey (Taiwan)	National Food Survey (Britain)	Electronic Commerce Survey (Britain and Taiwan)
Gender	Male=1 Female=2 recoded as 0	Male=1 Female=2 recoded as 0	Male=1 Female=2 recoded as 0	Male=1 Female=2 recoded as 0
Age	Exact age recoded to conform to coding in 'Retail Format and Food Consumption Survey' (Taiwan); observations falling outside the range are excluded from the analysis	15-20=1 21-30=2 31-40=3 41-50=4 51-60=5 61-70=6	Exact age recoded to conform to coding in 'Retail Format and Food Consumption Survey' (Taiwan); observations falling outside the range are excluded from the analysis	Exact age recoded to conform to coding in 'Retail Format and Food Consumption Survey' (Taiwan); observations falling outside the range are excluded from the analysis
Occupation	Managerial/professional (including self-employed professional) recoded as 'employer, manager or professional'=1 Clerical employee, manual employee, and self-employed (excluding self-employed professional) recoded as 'clerical or manual'=2 Retired and unemployed/not economically active recoded as 'economically inactive'=3	Employer or manager recoded as 'employer, manager or professional'=1 Clerical employee and manual employee recoded as 'clerical or manual'=2 Full time housewife, unemployed and full time student recoded as 'economically inactive'=3	Manager and self-employed with employees recoded as 'employer, manager or professional'=1 Foreman/supervisor, apprentice, etc. or employee not classified elsewhere and self-employed without employees recoded as 'clerical or manual'=2 Not applicable (e.g. unemployed, retired) recoded as 'economically inactive'=3	
Income	Annual household income divided by number of members in the household to get the per capita income, which is divided into three equal percentiles with: Upper one-third income category=1 Middle one-third income category=2 Lower one-third income category=3	Monthly family income divided by number of members in the family to get the per capita income, which is divided into three equal percentiles with: Upper one-third income category=1 Middle one-third income category=2 Lower one-third income category=3	Weekly net family income divided by number of members in the family to get the per capita income, which is divided into three equal percentiles with: Upper one-third income category=1 Middle one-third income category=2 Lower one-third income category=3	
Household size	1=1 2=2 3=3 4=4 5=5 6=6 7 and >=8 recoded as 7	1=1 2=2 3=3 4=4 5=5 6=6 7, 8, 9 and >=10 recoded as 7	Exact number recoded to conform to coding in 'Where People Shop Survey' or 'Retail Format and Food Consumption Survey' (Taiwan)	
Region	London=1 Else=0	TaipeiCity=1 Else=0	Greater London=1 Else=0	

Recoding allows standardized comparisons of the same variable between samples. Table 5.3 shows the profile of each sample in terms of the six recoded variables.

Table 5.3 – Sample profile by recoded demographic variables

Variable *Category*	Number of respondents Percentage of total					
	British Where People Shop Survey	*Taiwan Retail Format and Food Consumption Survey*	*British Electronic Commerce Survey*	*Taiwan Electronic Commerce Survey*	*British National Food Survey (total sample)*	*British National Food Survey (single adult household sample)*
Gender	623	1,200	2,240	1,000	5,973	1,856
Male	*25.7*	*51.0*	*42.4*	*50.0*	*74.8*	*33.2*
Female	*74.3*	*49.0*	*57.6*	*50.0*	*25.2*	*66.8*
Age group	534	1,200	1,993	970	5,052	1,381
15-20	*3.4*	*16.1*	*8.2*	*15.7*	*0.9*	*2.2*
21-30	*17.4*	*23.3*	*19.0*	*17.6*	*14.3*	*23.1*
31-40	*31.1*	*24.9*	*24.1*	*27.7*	*24.4*	*20.9*
41-50	*19.3*	*17.4*	*20.1*	*24.2*	*22.0*	*15.3*
51-60	*14.4*	*11.1*	*15.2*	*8.1*	*20.8*	*16.6*
61-70	*14.4*	*7.3*	*13.5*	*6.6*	*17.7*	*22.0*
Occupation	623	1,199			5,973	1,856
Employer, manager or professional	*11.4*	*12.2*			*16.9*	*7.3*
Clerical or manual	*49.9*	*40.4*			*46.0*	*33.2*
Economically inactive	*38.7*	*47.5*			*37.1*	*59.5*
Income	414	1,200			5,636	1,792
Upper	*41.5*	*48.4*			*34.7*	*34.4*
Middle	*25.6*	*22.5*			*33.0*	*27.3*
Lower	*32.9*	*29.1*			*32.3*	*38.3*
Household size	623	1,200			5,973	1,856
One	*27.8*	*2.2*			*25.2*	*81.2*
Two	*27.9*	*6.6*			*35.4*	*8.5*
Three	*17.3*	*11.0*			*16.9*	*7.1*
Four	*18.1*	*26.0*			*15.2*	*2.7*
Five	*6.6*	*25.0*			*5.1*	*0.4*
Six	*1.3*	*13.4*			*1.6*	*0.2*
Seven or more	*1.0*	*15.8*			*0.6*	*0.0*
Region of residence	623	1,200			5,973	1,856
Capital	*8.7*	*15.3*			*10.3*	*12.8*
Non-capital	*91.3*	*84.8*			*89.7*	*87.2*

5.2 Data problems

A dataset or an array of variables for a study may contain some specific characteristics that will bias the outcome of the analysis. It is therefore

essential to identify any potential data problems before proceeding to the stage of analysis. This study uses two non-conventional regression techniques – logistic regression and Poisson regression, which have been discussed in the previous 'Research Design' Chapter. The validity of the result of regression analysis depends much on whether there is any problem of multicollinearity among independent variables. Both logistic regression and Poisson regression adopt the logic of maximum likelihood for calculation. However, the process of maximum likelihood estimation is sometimes impaired by the problem of convergence. This section discusses these two problems in relation to the data used for the study. If any problem is found, a remedial measure will be sought.

5.2.1 Multicollinearity

Multicollinearity is defined as the existence of strong linear dependencies among the independent variables. Tacq (1997) posited that the problem of multicollinearity is not in the descriptive, but in the inferential sense of generalization from sample to population. It is because, as the correlations between independent variables become stronger, the estimations of the partial regression coefficient become less precise. This is especially a problem when the researcher wants to make a mutual comparison of the effects of the independent variables, because the large confidence intervals of the different partial regression coefficients lead to overlap and ambiguity.

Although correlation analysis is useful in detecting collinearity between any two variables, it is sometimes not sufficient. It is quite possible to have data in which high correlation is not found for any pair of variables, but several variables together may be highly interdependent.

Considering that multicollinearity is a property of the independent variables, rather than dependent variable, standard regression analysis can be applied to calculate the tolerance level of the independent variables planned to be used for logistic or Poisson regression analysis. The tolerance level is computed by regressing each independent variable on all the other independent variables, calculating the RSquare, then subtracting that from 1. Low tolerance levels correspond to higher risk of multicollinearity. A rule of thumb is that a tolerance level below 0.4 means high multicollinearity (Allison 1999), and therefore demands remedial action.

Results of multicollinearity tests are shown in Table 5.4 for all the hypothetical regression models of the Internet and retail formats, and Table 5.5 for the models of consumption trends. No single variable has a tolerance level below 0.5, and therefore the problem of multicollinearity is considered not to exist in this study.

Table 5.4 – Tolerance level of hypothetical regression models – Internet and retail formats

Variable	Internet (2000)	Internet (1998)	Hypermarket/ superstore	Supermarket	Traditional market
Gender	0.9950	0.8076	0.8070	0.8076	0.8076
Age group	0.9797	0.9418	0.9419	0.9418	0.9418
Occupation1	-	0.7439	0.7437	0.7439	0.7439
Occupation2	-	0.7398	0.7389	0.7398	0.7398
Income1	-	0.5863	0.5863	0.5863	0.5863
Income2	-	0.6629	0.6631	0.6629	0.6629
Household size	-	0.6273	0.6273	0.6273	0.6273
Region of residence	-	0.9763	0.9763	0.9763	0.9763
Country of residence	0.9754	0.6594	0.6591	0.6594	0.6594

- not considered in Internet (2000) regression model

Table 5.5 – Tolerance level of hypothetical regression models - Consumption trends

Variable	Convenience trend			Health trend		
	Britain		Taiwan	Britain		Taiwan
	Total sample	Single adult household sample		Total sample	Single adult household sample	
Gender	0.7985	0.8592	0.7594	0.7985	0.8592	0.7594
Age group	0.7910	0.7304	0.9660	0.7910	0.7304	0.9660
Occupation1	0.4947	0.6922	0.7126	0.4947	0.6922	0.7126
Occupation2	0.5118	0.6529	0.7222	0.5118	0.6529	0.7222
Income1	0.5498	0.4716	0.5992	0.5498	0.4716	0.5992
Income2	0.7428	0.7171	0.6724	0.7428	0.7171	0.6724
Household size	0.6728	0.6219	0.8570	0.6728	0.6219	0.8570
Region of residence	0.9851	0.9751	0.9867	0.9851	0.9751	0.9867

5.2.2 Non-convergence

Both logistic regression and Poisson regression estimate parameters by fitting them to the actual data. This is via an iterative process in which the algorithm makes an initial 'guess' at the parameters that may fit the data, and then proceeds to improve them in subsequent iterations until the best possible parameters are obtained. Such a process is called maximum likelihood.

However, there may be cases when the maximum likelihood process cannot converge, and therefore the best possible parameters cannot be found. This is particularly likely for binary logistic regression where only two values exist for the dependent variable. There are two possible conditions of such non-convergence. The first is when independent variables perfectly explain the dependent variable. This is termed complete separation. The second is when there is complete separation except for a single value of the

independent variable for which both values of the binary dependent variable occur. This is termed quasi-complete separation.

As shown in Table 5.2, the recoded age variable comprises six levels: 15-20, 21-30, 31-40, 41-50, 51-60, and 61-70. This variable was originally expressed in dummy form for its insertion into hypothetical regression models. Two dummy variables were then created: age1 and age2. The value of age1 was set to be 1 if age of respondent was 15-30, and 0 if otherwise. The value of age2 was set to be 1 if age of respondent was 31-50, and 0 if otherwise. Dummy form is considered better than quantitative form because the six levels of the variable are, strictly speaking, categorical levels.

However, a preliminary run of all the hypothetical regression models incorporating the age variable in dummy form shows the existence of quasi-complete separation in the Internet regression model. Statistical output prints the warning as below:

'There is possibly a quasicomplete separation in the sample points. The maximum likelihood estimate may not exist.
The LOGISTIC procedure continues in spite of the above warning. Results shown are based on the last maximum likelihood iteration. Validity of the model fit is questionable.'

Evidence of quasi-complete separation can be inferred from regression results. Variables plagued by quasi-complete separation have comparatively much larger parameter estimate and standard error. Age1 and age2 in Table 5.6 are two such variables.

Table 5.6 – Partial results of Internet (1998) regression model that uses dummy form of the age variable

Variable	Parameter estimate	Standard error
Intercept	-17.0514	146.2000
Gender	0.5836	0.4335
Age1	12.3352	146.2000
Age2	11.7506	146.2000
Occupation1	0.2759	0.6307
Occupation2	-0.2074	0.5059
Income1	-1.0937	0.5307
Income2	-0.7074	0.5470
Household size	0.2371	0.1549
Region of residence	0.2263	0.5677
Country	1.7488	0.5716

The problem arises from the same value of the outcome category for a particular level of the problematic variable. To redress the problem, Allison (1999) suggested treating the problematic variable as a quantitative variable, so that there will not be any particular level of the problematic variable. Treating a variable as quantitative in nature assumes that the effect of the variable is linear. This study takes this assumption and uses the age variable in a quantitative manner, i.e. 15-20 referred to as 1, 21-30 as 2, 31-40 as 4, and so on. Results of Internet (1998) regression model using quantitative form show that the parameter estimate and standard error of the age variable returns to normal, and therefore quasi-complete separation does not recur.

5.3 Hypothetical regression models

The six recoded demographic variables illustrated in Table 5.2, having been cleared of multicollinearity and non-convergence, are used as the intra-country segmentation variables, while country of residence is used as the between-country segmentation variable. Except 'household size' and 'age group' that are taken as quantitative variables, all other variables enter the

hypothetical regression models in dummy form. Meaning and labelling of each of these variables adjusted for regression are elaborated below.

Gender: male is labeled as '1', and female as '0' (same as what is shown in Table 5.2).

Age group (abbreviated as Age): recoded number from 1 to 6 representing respective age group (same as what is shown in Table 5.2).

Occupation: two dummy variables are created. Occ1 is '1' if the respondent is an employer, manager or professional, and '0' if otherwise. Occ2 is '1' if the respondent is involved in clerical or manual work, and '0' if otherwise.

Income: two dummy variables are created. Inc1 is '1' if the respondent belongs to lower one-third income category, and '0' if otherwise. Inc2 is '1' if the respondent falls into middle one-third income category, and '0' if otherwise.

Household size (abbreviated as Hhsize): recoded number of available members in the household (same as what is shown in Table 5.2).

Region of residence (abbreviated as Region): living in the capital city is labeled as '1', and living in other areas is labeled as '0' (same as what is shown in Table 5.2).

Country of residence (abbreviated as Country): living in Britain is labeled as '1'; living in Taiwan is labeled as '0'.

The concepts of 'retail choice' and 'participation decision', as defined in Chapter 4, are adopted in setting up segmentation targets for regression analysis. 'Retail choice' is first evaluated in an intra-country context, so as to

identify significant variables affecting the choice of the Internet, the hypermarket/superstore, the supermarket, and the traditional market respectively, in each of the two countries in 1998. It is then tested in a pan-country context, which is of two dimensions – static and dynamic. The two dimensions are interpreted simply in terms of whether time is additionally considered in the analysis. 'Retail choice (static pan-country)' encompasses the Internet, the hypermarket/superstore, the supermarket, and the traditional market on the same year basis of 1998. 'Retail choice (dynamic pan-country)' focuses on the Internet across two years – 1998 and 2000. 'Participation decision (intra-country)' covers both convenience and health trends. All the segmentation targets arising from 'retail choice' are expressed in binary form, while those stemming from 'participation decision' are expressed in count number form. Accordingly, the four groups of hypothetical regression models are written as below.

$$\textit{Retail choice (intra-country)} = b_0 + b_1\textit{*Gender} + b_2\textit{*Age} + b_3\textit{*Occ1} + b_4\textit{*Occ2} + b_5\textit{*Inc1} + b_6\textit{*Inc2} + b_7\textit{*Hhsize} + b_8\textit{*Region}$$

$$\textit{Retail choice (static pan-country)} = b_0 + b_1\textit{*Gender} + b_2\textit{*Age} + b_3\textit{*Occ1} + b_4\textit{*Occ2} + b_5\textit{*Inc1} + b_6\textit{*Inc2} + b_7\textit{*Hhsize} + b_8\textit{*Region} + b_9\textit{*Country}$$

$$\textit{Retail choice (dynamic pan-country)} = b_0 + b_1\textit{*Gender} + b_2\textit{*Age} + b_3\textit{*Country}$$

$$\textit{Participation decision (intra-country)} = b_0 + b_1\textit{*Gender} + b_2\textit{*Age} + b_3\textit{*Occ1} + b_4\textit{*Occ2} + b_5\textit{*Inc1} + b_6\textit{*Inc2} + b_7\textit{*Hhsize} + b_8\textit{*Region}$$

where:

- 'Retail choice (intra-country)' refers to, in an intra-country context, whether the respondent used each of the four retail formats (Internet, Hypermarket/superstore, Supermarket, and Traditional market) in the month prior to the Survey in 1998;

- 'Retail choice (static pan-country)' refers to, in a pan-country context, whether the respondent used each of the four retail formats (Internet, Hypermarket/superstore, Supermarket, and Traditional market) in the month prior to the Survey in 1998;

- 'Retail choice (dynamic pan-country)' refers to, in a pan-country context, whether the respondent used the Internet in the month prior to each of the two Surveys, one in 1998 and another in 2000;

- 'Participation decision (intra-country)' refers to, in an intra-country context, the number of varieties of food products representing each of the two consumption trends (convenience trend and health trend) consumed during a Survey period in 1998;

- b_0 is the intercept;

- b_1, b_2 ... b_9, b_{10} are regression coefficients for their respective variables.

As noted in the hypothetical regression models above, only gender and age are used as intra-country segmentation variables in the retail choice (dynamic) regression models because Electronic Commerce Survey does not incorporate other intra-country segmentation variables. There is no country variable in the participation decision regression models because datasets for Britain National Food Survey and Taiwan Retail Format and Food Consumption Survey have been found to be incomparable to each other in Chapter 4.

5.4 Findings

The previous Chapter has noted that a three-stage analysis will be conducted for each segmentation target. This section will present the findings arising from the analysis according to these three stages.

5.4.1 Intra-country analysis

5.4.1.1 Retail formats

This sub-section covers the analysis of four retail formats - the Internet, the hypermarket/superstore, the supermarket, and the traditional market - for each of the two countries – Britain and Taiwan, resulting in eight different intra-country analyses, each of which uses a variety of statistical techniques, including means, analysis of variance (ANOVA), pairwise comparison, and logistic regression.

Internet Table 5.7 shows that the intra-country demographic structures of Internet shoppers in Britain and Taiwan are quite different. In Britain, Internet shoppers were predominantly male, and this is found to be significant at 80% confidence level. In Taiwan, although the trend is the same, it is not statistically significant.

In Britain, Internet shoppers are significantly related to age, albeit at a loose confidence level of 70%. The younger a person is, the more likely this person is an Internet shopper. In Taiwan, there is a very clear dichotomy between people aged less than 50 and those aged above 50 with regard to their Internet shopping behaviour, but the picture for different age groups below 50 is not so clear cut as what happens in Britain. It seems that people aged

15 to 20 and people aged 31 to 40 are more likely to make online purchase than people in other age groups below 50.

Occupation exerts slightly greater influence on Internet shopping in Taiwan than in Britain. People belonging to the employer/manager/professional category are more inclined to become Internet shoppers than other people in Taiwan. In Britain, people at work are more likely to be Internet shoppers than people not at work, but it is not statistically significant.

Income is found to exert a very significant impact on Internet shopping in Taiwan. The higher income group is far more likely than others to buy online. In Britain, although it is also found that Internet shopping is skewed toward higher income people, there is an absence of evidence in statistical terms.

Household size has a slight influence on Internet shopping in both Britain and Taiwan. In Britain, it seems that people in three-to-five person households are more inclined to shop over the Internet. In Taiwan, two-to-five person households are more likely to have Internet shoppers. One major difference between the two countries is that one-person households are very unlikely to become Internet shoppers in Taiwan, and such a phenomenon is not so explicit in Britain.

In Taiwan, people living in the capital city, Taipei, are more inclined to shop online than people living in other areas. The difference in inclination is found to be significant at 80% confidence level. On the contrary, in Britain, no statistical difference between London people and non-London people about their Internet shopping experience is discovered.

Overall, economic and urbanization condition seems to exert more influence in Internet shopping in Taiwan as opposed to Britain. Wu (2000) noted that Internet usage in Taiwan is a sort of 'privilege' of higher educated class, who usually are more capable of aspiring to a higher economic status, and urban people.

Table 5.7 - Demographic structure of Internet shoppers in Britain and Taiwan

Variable	Category	Britain (%)	Taiwan (%)
Gender	**Overall test of significance**	**	-
	Male	3.1	1.0
	Female	1.3	0.7
Age	**Overall test of significance**	*	-
	Aged 15-20	5.6	1.0
	Aged 21-30	4.3	0.7
	Aged 31-40	2.4	1.7
	Aged 41-50	1.9	0.5
	Aged 51-60	0	0
	Aged 61-70	0	0
Occupation	**Overall test of significance**	-	*
	Employer, manager or professional	2.8	2.1
	Clerical or manual	2.3	0.6
	Economically inactive	0.8	0.7
Income	**Overall test of significance**	-	****
	High income	2.9	2.0
	Middle income	2.8	0
	Low income	2.3	0.5
Household size	**Overall test of significance**	**	*
	One	1.2	0
	Two	1.1	1.3
	Three	1.9	0.8
	Four	2.7	0.6
	Five	2.4	2.0
	Six	0	0
	Seven or more	[1]	0
Region of residence	**Overall test of significance**	-	**
	Capital	0	1.6
	Non-capital	1.9	0.7

[1] No figure in this cell due to too small number of respondents affiliated with a household size of seven or more

***** significant at 99% confidence level; **** significant at 95% confidence level ; *** significant at 90% confidence level; ** significant at 80% confidence level;
* significant at 70% confidence level; - not significant at 70% confidence level

Table 5.7 shows results of overall test of significance of each considered demographic variable. A significant demographic variable so found automatically leads to a significant difference between the two levels of a dichotomous variable, such as 'gender' and 'region of residence' in this study, but does not necessarily imply significant differences between all the levels of a non-dichotomous variable. In order to develop a greater insight into the relationship between Internet choice and each of these non-dichotomous variables, a pairwise comparison test is undertaken for every such variable in their relationship with Internet shopping in Britain and Taiwan respectively.

For the purpose of clarity, pairwise comparisons are conducted on the basis of a universal cut-off line of 95% confidence level. Corresponding results for Britain and Taiwan are shown in Table 5.8 and Table 5.9 respectively. Pairwise comparisons of dichotomous variables are also included so that the results are presented in their totality.

As shown in Table 5.8, in Britain, although age is not significant in the overall significant test at 95% confidence level, some levels of each of these two variables are found significantly different from other levels at the same confidence level in the pairwise comparison test. People aged 21-30 are more inclined to use Internet shopping than people aged 51-60 and those aged 61-70.

Table 5.8 – Pairwise comparison of Internet shopping in Britain for all levels within each considered variable

Gender	Male	Female
Male		-
Female		

Age	Aged 15-20	Aged 21-30	Aged 31-40	Aged 41-50	Aged 51-60	Aged 61-70
Aged 15-20		-	-	-	-	-
Aged 21-30			-	-	*	*
Aged 31-40				-	-	-
Aged 41-50					-	-
Aged 51-60						-
Aged 61-70						

Occupation	Employer, manager or professional	Clerical or manual	Economically inactive
Employer, manager or professional		-	-
Clerical or manual			-
Economically inactive			

Income	High income	Medium income	Low income
High income		-	-
Medium income			-
Low income			

Household size	One	Two	Three	Four	Five	Six	Seven or more [1]
One		-	-	-	-	-	*
Two			-	-	-	-	*
Three				-	-	-	*
Four					-	-	*
Five						-	*
Six							*
Seven or more							

Region of Residence	Capital	Non-capital
Capital		-
Non-capital		

[1] Not discussed in the main text due to too small number of respondents affiliated with a household size of seven or more

Note: * significant at 95% confidence level; - non-significant at 95% confidence level

Both ANOVA and the pairwise comparison test determine the statistical significance by considering one variable at a time only. There is always the possibility that a particular independent variable affects and is affected by

some other independent variables in exercising its influence on the dependent variable in question. As such, logistic regression analysis is used to consider all the six hypothetical independent variables simultaneously. Results, as in Table 5.9, show that age is the only variable that influences consumer choice of Internet shopping in Britain. Generally speaking, the propensity to buy online is higher for a younger generation.

Table 5.9 – Logistic regression results using forward selection of British Internet shopping

Variable	Parameter estimate	Pr > chi-square	Standardized estimate
Constant	-1.2018	0.1566	.
Gender			
Age group	-0.7186	0.0151	-0.5307
Occupation1			
Occupation2			
Income1			
Income2			
Household size			
Area of residence			

In Taiwan, income has been found a significant factor of Internet choice at 95% confidence level (Table 5.7). This result is substantiated in Table 5.10, which highlights a significant difference between high income and low income groups in Internet choice. By contrast, no significant difference is found between the medium income group and any of the other two income groups. In the case of household size, a significant difference is found between five-person household and six-person household groups, which may be effected by other mitigating factors not being considered.

Table 5.10 – Pairwise comparison of Internet shopping in Taiwan for all levels within each considered variable

Gender	Male	Female
Male		-
Female		

Age	Aged 15-20	Aged 21-30	Aged 31-40	Aged 41-50	Aged 51-60	Aged 61-70
Aged 15-20		-	-	-	-	-
Aged 21-30			-	-	-	-
Aged 31-40				-	-	-
Aged 41-50					-	-
Aged 51-60						-
Aged 61-70						

Occupation	Employer, manager or professional	Clerical or manual	Economically inactive
Employer, manager or professional		-	-
Clerical or manual			-
Economically inactive			

Income	High income	Medium income	Low income
High income		-	*
Medium income			-
Low income			

Household size	One	Two	Three	Four	Five	Six	Seven or more
One		-	-	-	-	-	-
Two			-	-	-	-	-
Three				-	-	-	-
Four					-	-	-
Five						*	-
Six							-
Seven or more							

Region of Residence	Capital	Non-capital
Capital		-
Non-capital		

Note: * significant at 95% confidence level; - non-significant at 95% confidence level

By considering all the hypothetical independent variables at the same time, Table 5.11 shows that age and occupation significantly influence Internet shopping choice in Taiwan. If a Taiwanese is younger and/or engaged in the

employer/managerial/professional position, he/she is more prone to pursue Internet shopping.

Table 5.11 – Logistic regression results using forward selection of Taiwanese Internet shopping

Variable	Parameter estimate	Pr > chi-square	Standardized estimate
Constant	-3.1430	0.0001	.
Gender			
Age group	-0.5147	0.0240	-0.4132
Occupation1	1.2177	0.0487	0.2213
Occupation2			
Income1			
Income2			
Household size			
Area of residence			

Hypermarket/superstore Gender does not account for the use of hypermarkets/superstores in Britain. In Taiwan, at a loose confidence level of 70%, women are more inclined to use these outlets than men.

In Britain, no significant difference in usage rate exists between age groups, although people age 15 to 20 look as if they are less prone to use this format. In Taiwan, age exerts a very significant impact on hypermarket/superstore use. In general, the older a person is, the more unlikely he/she uses the format.

Hypermarkets/superstores are more likely to be patronized by people of higher occupation status and income class in Britain. This validates Euromonitor's (1988) study that 'higher income shoppers were more likely to travel further for grocery needs. Unemployed and retired people are especially dependent on local stores'. The same phenomena apply in Taiwan. It is noteworthy, however, that in this regard income is a more determining factor than occupation for both countries.

In both countries, household size is not influential in the choice mechanism of hypermarkets/superstores for shopping.

By contrast, region of residence exerts a very significant effect on hypermarket/superstore usage in the two countries. Directions of the effect, though, are different. In Britain, hypermarkets/superstores have a wider appeal to non-London residents. In Taiwan, Taipei residents are far more likely to use the format than other residents.

Table 5.12 - Demographic structure of hypermarket/superstore shoppers in Britain and Taiwan

Variable	Category	Britain (%)	Taiwan (%)
Gender	**Overall test of significance**	-	*
	Male	41.9	50.2
	Female	39.7	53.3
Age	**Overall test of significance**	-	*****
	Aged 15-20	27.8	56.0
	Aged 21-30	45.2	55.4
	Aged 31-40	41.6	56.9
	Aged 41-50	38.8	48.3
	Aged 51-60	40.3	44.4
	Aged 61-70	44.2	32.2
Occupation	**Overall test of significance**	**	*
	Employer, manager or professional	46.5	57.5
	Clerical or manual	42.1	52.2
	Economically inactive	36.1	49.7
Income	**Overall test of significance**	*****	*****
	High income	50.7	61.8
	Middle income	44.3	49.8
	Low income	28.5	46.7
Household size	**Overall test of significance**	-	-
	One	41.0	42.3
	Two	40.2	45.6
	Three	38.9	55.3
	Four	45.1	51.0
	Five	34.1	56.2
	Six	25.0	48.4
	Seven or more	16.7	50.0
Region of residence	**Overall test of significance**	*****	*****
	Capital	22.2	67.8
	Non-capital	42.0	48.8

***** significant at 99% confidence level; **** significant at 95% confidence level ; *** significant at 90% confidence level; ** significant at 80% confidence level;
* significant at 70% confidence level; - not significant at 70% confidence level

Income has been found an influential factor of hypermarket/superstore choice in Britain. A pairwise comparison test in Table 5.13 shows that the watershed that determines whether the factor is influential or not is some way between low income and medium income. It is because significant differences are found between low income and each of the other two income groups. Yet no difference is found between high income and low income.

Table 5.13 – Pairwise comparison of hypermarket/superstore shopping in Britain for all levels within each considered variable

Gender	Male	Female
Male		-
Female		

Age	Aged 15-20	Aged 21-30	Aged 31-40	Aged 41-50	Aged 51-60	Aged 61-70
Aged 15-20		-	-	-	-	-
Aged 21-30			-	-	-	-
Aged 31-40				-	-	-
Aged 41-50					-	-
Aged 51-60						-
Aged 61-70						

Occupation	Employer, manager or professional	Clerical or manual	Economically inactive
Employer, manager or professional		-	-
Clerical or manual			-
Economically inactive			

Income	High income	Medium income	Low income
High income		-	*
Medium income			*
Low income			

Household size	One	Two	Three	Four	Five	Six	Seven or more
One		-	-	-	-	-	-
Two			-	-	-	-	-
Three				-	-	-	-
Four					-	-	-
Five						-	-
Six							-
Seven or more							

Region of Residence	Capital	Non-capital
Capital		*
Non-capital		

Note: * significant at 95% confidence level; - non-significant at 95% confidence level

Considering all the six hypothetical independent variables simultaneously, Table 5.14 shows that only income is found to be significantly influencing consumer choice of hypermarket/superstore shopping in Britain. People in

the lowest one-third income category are most unlikely to use the hypermarket or the superstore.

Table 5.14 – Logistic regression results using forward selection of British hypermarket/superstore shopping

Variable	Parameter estimate	Pr > chi-square	Standardized estimate
Constant	-0.0862	0.5337	.
Gender			
Age group			
Occupation1			
Occupation2			
Income1	-0.7023	0.0020	-0.1906
Income2			
Household size			
Area of residence			

In Taiwan, age has been found a significant factor of hypermarket/superstore choice in Taiwan at 95% confidence level. Yet with six levels of this variable, it is difficult to judge which levels are significant from others in the context of the overall significance test. A pairwise comparison test in Table 5.15 assists in condensing the six levels of the variable into two broad groups with regard to their relationship with hypermarket/superstore choice. As such, any levels aged at or below 41-50 are not significantly different from each other, and the same results are found for any levels aged at or above 51-60, while any one level in the former is significantly different from any one level in the latter.

In the case of income, the high-income group is significantly more likely than the other two income groups to use hypermarkets/superstores in Taiwan, while no difference is found between the medium and the low-income groups. This signifies that hypermarket/superstore shopping is more likely

an activity of higher income people, but it does not particularly exclude the lower income people.

Table 5.15 – Pairwise comparison of hypermarket/superstore shopping in Taiwan for all levels within each considered variable

Gender	Male	Female
Male		-
Female		

Age	Aged 15-20	Aged 21-30	Aged 31-40	Aged 41-50	Aged 51-60	Aged 61-70
Aged 15-20		-	-	-	*	*
Aged 21-30			-	-	*	*
Aged 31-40				-	*	*
Aged 41-50					-	*
Aged 51-60						-
Aged 61-70						

Occupation	Employer, manager or professional	Clerical or manual	Economically inactive
Employer, manager or professional		-	-
Clerical or manual			-
Economically inactive			

Income	High income	Medium income	Low income
High income		*	*
Medium income			-
Low income			

Household size	One	Two	Three	Four	Five	Six	Seven or more
One		-	-	-	-	-	-
Two			-	-	-	-	-
Three				-	-	-	-
Four					-	-	-
Five						-	-
Six							-
Seven or more							

Region of Residence	Capital	Non-capital
Capital		*
Non-capital		

Note: * significant at 95% confidence level; - non-significant at 95% confidence level

A simultaneous analysis of all the six hypothetical independent variables with respect to their possible effect on Taiwanese hypermarket/superstore

shopping shows that three variables – age, income, and area of residence – are significant (Table 5.16). This result is congruent to that found when each hypothetical independent variable is considered in isolation (Table 5.12).

Table 5.16 – Logistic regression results using forward selection of Taiwanese hypermarket/superstore shopping

Variable	Parameter estimate	Pr > chi-square	Standardized estimate
Constant	0.9284	0.0001	.
Gender			
Age group	-0.1938	0.0001	-0.1557
Occupation1			
Occupation2			
Income1	-0.5774	0.0001	-0.1591
Income2	-0.4501	0.0078	-0.1037
Household size			
Area of residence	0.8391	0.0001	0.1654

Supermarket Gender and age – two of the most fundamental demographic variables – play a very significant role in Taiwanese supermarket usage. Females are more likely to patronize this format than the male, and people aged less than 50 are more prone to use the supermarket than others. These phenomena do not generally apply in Britain.

In both countries, occupation and household size are found to be non-significant in their hypothetical effects on supermarket usage.

On the other hand, income produces such an effect in a significant fashion. People in the top one-third income category are very much more likely to use the format. Yet the income effect is found to be non-significant in Britain.

Region of residence plays a significant role in Britain and Taiwan, with the same direction but varying degrees of effect. In both countries, people living in the capital city are more prone to use the supermarket than people living

outside the capital city. This phenomenon is more acute in Britain being significant at a strict 99% confidence level than in Taiwan being significant at a confidence level of only 80%.

Table 5.17 - Demographic structure of supermarket shoppers in Britain and Taiwan

Variable	Category	Britain (%)	Taiwan (%)
Gender	**Overall test of significance**	-	*****
	Male	71.3	68.1
	Female	69.3	74.3
Age	**Overall test of significance**	*	*****
	Aged 15-20	61.1	77.7
	Aged 21-30	75.3	73.5
	Aged 31-40	69.3	76.9
	Aged 41-50	67.0	70.3
	Aged 51-60	62.3	58.6
	Aged 61-70	76.6	50.6
Occupation	**Overall test of significance**	-	-
	Employer, manager or professional	74.6	74.0
	Clerical or manual	68.2	70.9
	Economically inactive	70.5	70.7
Income	**Overall test of significance**	-	*****
	High income	71.3	80.2
	Middle income	71.7	69.1
	Low income	75.6	67.1
Household size	**Overall test of significance**	-	-
	One	67.6	57.7
	Two	73.0	75.9
	Three	70.4	69.7
	Four	66.4	69.9
	Five	70.7	74.7
	Six	75.0	67.7
	Seven or more	83.3	71.6
Region of residence	**Overall test of significance**	*****	**
	Capital	92.6	76.0
	Non-capital	67.7	70.3

***** significant at 99% confidence level; **** significant at 95% confidence level ; *** significant at 90% confidence level; ** significant at 80% confidence level;
* significant at 70% confidence level; - not significant at 70% confidence level

As shown in Table 5.18, no significant difference is found for any pair of levels of any considered variable that involves more than two levels in Britain. This strengthens the findings in Table 5.17, where, with the

exception of the 'region of residence' variable, demographic variables do not play an important role in British supermarket shopping on the criterion of 95% confidence level.

Table 5.18 – Pairwise comparison of supermarket shopping in Britain for all levels within each considered variable

Gender	Male	Female
Male		-
Female		

Age	Aged 15-20	Aged 21-30	Aged 31-40	Aged 41-50	Aged 51-60	Aged 61-70
Aged 15-20		-	-	-	-	-
Aged 21-30			-	-	-	-
Aged 31-40				-	-	-
Aged 41-50					-	-
Aged 51-60						-
Aged 61-70						

Occupation	Employer, manager or professional	Clerical or manual	Economically inactive
Employer, manager or professional		-	-
Clerical or manual			-
Economically inactive			

Income	High income	Medium income	Low income
High income		-	-
Medium income			-
Low income			

Household size	One	Two	Three	Four	Five	Six	Seven or more
One		-	-	-	-	-	-
Two			-	-	-	-	-
Three				-	-	-	-
Four					-	-	-
Five						-	-
Six							-
Seven or more							

Region of Residence	Capital	Non-capital
Capital		*
Non-capital		

Note: * significant at 95% confidence level; - non-significant at 95% confidence level

By considering all the six hypothetical independent variables at the same time, 'area of residence' is the only variable that influences whether a British subject uses the supermarket (Table 5.19). This result is the same as that found when each independent variable is considered separately (Table 5.17).

Table 5.19 – Logistic regression results using forward selection of British supermarket shopping

Variable	Parameter estimate	Pr > chi-square	Standardized estimate
Constant	0.8634	0.0001	.
Gender			
Age group			
Occupation1			
Occupation2			
Income1			
Income2			
Household size			
Area of residence	13.6312	0.9605	1.9658

A different picture is shown in Taiwan, where gender, age and income significantly influence whether people use the supermarket. A pairwise comparison test on age collapses the six levels of the age variable into two groups. People aged at or below 41-50 are more likely than people aged at or above 51-60 to use the supermarket. A pairwise comparison test also clarifies the position of the income variable, in the sense that higher income people are significantly more likely than medium and lower income people in using the supermarket, while no significant difference is found between medium and lower income people. This dovetails the result found in hypermarket/superstore shopping. So the pattern of the effect of income on hypermarket/superstore and supermarket shopping is similar in Taiwan.

Table 5.20 – Pairwise comparison of supermarket shopping in Taiwan for all levels within each considered variable

Gender	Male	Female
Male		*
Female		

Age	Aged 15-20	Aged 21-30	Aged 31-40	Aged 41-50	Aged 51-60	Aged 61-70
Aged 15-20		-	-	-	*	*
Aged 21-30			-	-	*	*
Aged 31-40				-	*	*
Aged 41-50					*	*
Aged 51-60						-
Aged 61-70						

Occupation	Employer, manager or professional	Clerical or manual	Economically inactive
Employer, manager or professional		-	-
Clerical or manual			-
Economically inactive			

Income	High income	Medium income	Low income
High income		*	*
Medium income			-
Low income			

Household size	One	Two	Three	Four	Five	Six	Seven or more
One		-	-	-	-	-	-
Two			-	-	-	-	-
Three				-	-	-	-
Four					-	-	-
Five						-	-
Six							-
Seven or more							

Region of Residence	Capital	Non-capital
Capital		-
Non-capital		

Note: * significant at 95% confidence level; - non-significant at 95% confidence level

As in the case of British supermarket shopping, ANOVA and logistic regression results are generally the same in Taiwanese supermarket shopping (Table 5.17 and Table 5.21). Using either technique, three variables – gender, age, and income – stand out to be significant.

Table 5.21 – Logistic regression results using forward selection of Taiwanese supermarket shopping

Variable	Parameter estimate	Pr > chi-square	Standardized estimate
Constant	2.3799	0.0001	.
Gender	-0.3818	0.0042	-0.1053
Age group	-0.2350	0.0001	-0.1887
Occupation1			
Occupation2			
Income1	-0.7347	0.0001	-0.2025
Income2	-0.6478	0.0008	-0.1492
Household size			
Area of residence			

Traditional market There is an overall sharp contrast in the influence of postulated demographic variables on traditional market shopping between Britain and Taiwan. All the six demographic variables are found to be significant, albeit at varying degrees in Taiwan. By contrast, only gender is found to be very significant, while age is slightly significant, in Britain. Furthermore, the direction and span of effect of gender and age, though significant, are different between the two countries. In the case of gender, females are more likely to use the traditional market in Taiwan, but the opposite is true in Britain, where males are much more likely to use the format. In the case of age, people aged more than 30, without any further significant difference between age groups (i.e. among aged 31-40, aged 41-50, aged 51-60 and aged 61-70), are more likely to do traditional market shopping in Taiwan. Yet in Britain, only those people aged above 60 are more prone to patronize the traditional market. So in terms of the coverage of population, the span of age effect is wider in Taiwan than in Britain.

Occupation, income, household size, and region of residence are also significant in Taiwan. Specifically speaking, traditional market shopping is more likely to be found in those people who are economically inactive, in the

lower one-third income category, with a household size of six or more, or living in the capital city.

As no literature probing explanations of the demographic profile of Taiwanese traditional markets exists, this study attempts a conjectured explanation. The economically inactive are less time pressed and therefore are more likely to shop at the traditional market that usually takes more shopping time and have a shorter span of opening hours. Lower income people are more motivated to shop at traditional markets where they can bargain for price. Larger households are more prone to buy a whole fish or a live chicken slaughtered at traditional markets. The significance of the 'region of residence' variable is more difficult to conjecture.

Table 5.22 - Demographic structure of traditional market shoppers in Britain and Taiwan

Variable	Category	Britain (%)	Taiwan (%)
Gender	**Overall test of significance**	*****	*****
	Male	28.8	67.8
	Female	17.3	87.8
Age	**Overall test of significance**	*	*****
	Aged 15-20	11.1	60.1
	Aged 21-30	18.3	67.0
	Aged 31-40	18.7	83.6
	Aged 41-50	21.4	88.5
	Aged 51-60	18.2	88.0
	Aged 61-70	31.2	87.4
Occupation	**Overall test of significance**	-	*****
	Employer, manager or professional	14.1	76.7
	Clerical or manual	21.5	71.9
	Economically inactive	20.3	82.6
Income	**Overall test of significance**	-	***
	High income	22.8	76.1
	Middle income	20.8	73.6
	Low income	22.1	80.6
Household size	**Overall test of significance**	-	****
	One	22.0	61.5
	Two	25.3	81.0
	Three	15.7	73.5
	Four	16.8	75.0
	Five	12.2	76.3
	Six	25.0	82.6
	Seven or more	16.7	83.2
Region of residence	**Overall test of significance**	-	*
	Capital	20.4	80.9
	Non-capital	20.2	77.0

***** significant at 99% confidence level; **** significant at 95% confidence level ; *** significant at 90% confidence level; ** significant at 80% confidence level;
* significant at 70% confidence level; - not significant at 70% confidence level

Using 95% confidence level as the cut-off point, age as a whole is not significant in British traditional market shopping. Yet at the same confidence level, some levels of the age variable are significantly different from each other. Table 5.23 shows that people aged 61-70 are more prone to use the traditional market than people aged 21-30, 31-40, and 51-60.

Table 5.23 – Pairwise comparison of traditional market shopping in Britain for all levels within each considered variable

Gender	Male	Female
Male		*
Female		

Age	Aged 15-20	Aged 21-30	Aged 31-40	Aged 41-50	Aged 51-60	Aged 61-70
Aged 15-20		-	-	-	-	-
Aged 21-30			-	-	-	*
Aged 31-40				-	-	*
Aged 41-50					-	-
Aged 51-60						*
Aged 61-70						

Occupation	Employer, manager or professional	Clerical or manual	Economically inactive
Employer, manager or professional		-	-
Clerical or manual			-
Economically inactive			

Income	High income	Medium income	Low income
High income		-	-
Medium income			-
Low income			

Household size	One	Two	Three	Four	Five	Six	Seven or more
One		-	-	-	-	-	-
Two			-	-	-	-	-
Three				-	-	-	-
Four					-	-	-
Five						-	-
Six							-
Seven or more							

Region of Residence	Capital	Non-capital
Capital		-
Non-capital		

Note: * significant at 95% confidence level; - non-significant at 95% confidence level

Table 5.24 shows that gender is again, as in Table 5.22, singled out as the only significant variable influencing consumer choice of traditional market shopping in Britain. Surprisingly, the male are more likely than the female to

use the traditional market. It will be interesting to study for the causes of such a phenomenon.

Table 5.24 – Logistic regression results using forward selection of British traditional market shopping

Variable	Parameter estimate	Pr > chi-square	Standardized estimate
Constant	-1.5212	0.0001	.
Gender	0.7836	0.0035	0.1961
Age group			
Occupation1			
Occupation2			
Income1			
Income2			
Household size			
Area of residence			

More cases of pairwise difference of more-than-two-level variables are found in Taiwan. In the case of age, any level at or below 21-30 is significantly different from any level at or above 31-40, with the latter being more likely to use the traditional market. With regard to occupation, the economically inactive are more inclined than clerical or manual employees, but not more inclined than the employer, manager or professional, to use the format. Considering income, low income people are more likely than medium income people, but not more likely than higher income people, to use the traditional market. These findings, in aggregate, show that traditional market shopping can be regarded as an activity more intensively pursued by lower income people who are more likely to be economically inactive, but it cannot be regarded as an activity particularly not pursued by higher income people who are arguably more likely to be the employer, manager or professional.

Finally in the case of household size, the pattern of cases of pairwise difference seems unsystematic. Yet it is quite clear that very large

households are more inclined than smaller households, particularly one-person, three-person and four-person households, to use the traditional market.

Table 5.25 – Pairwise comparison of traditional market shopping in Taiwan for all levels within each considered variable

Gender	Male	Female
Male		*
Female		

Age	Aged 15-20	Aged 21-30	Aged 31-40	Aged 41-50	Aged 51-60	Aged 61-70
Aged 15-20		-	*	*	*	*
Aged 21-30			*	*	*	*
Aged 31-40				-	-	-
Aged 41-50					-	-
Aged 51-60						-
Aged 61-70						

Occupation	Employer, manager or professional	Clerical or manual	Economically inactive
Employer, manager or professional		-	-
Clerical or manual			*
Economically inactive			

Income	High income	Medium income	Low income
High income		-	-
Medium income			*
Low income			

Household size	One	Two	Three	Four	Five	Six	Seven or more
One		*	-	-	-	*	*
Two			-	-	-	-	-
Three				-	-	-	*
Four					-	-	*
Five						-	-
Six							-
Seven or more							

Region of Residence	Capital	Non-capital
Capital		-
Non-capital		

Note: * significant at 95% confidence level; - non-significant at 95% confidence level

Considering all the hypothetical independent variables at the same time, the logistic regression analysis shows that four variables – gender, age, occupation, and household size – exert significant influences on Taiwanese traditional market shopping from the consumer perspective (Table 5.26). This result is the same as that found if each hypothetical independent variable is considered separately (Table 5.22).

Table 5.26 – Logistic regression results using forward selection of Taiwanese traditional market shopping

Variable	Parameter estimate	Pr > chi-square	Standardized estimate
Constant	-0.0567	0.8605	.
Gender	-1.1767	0.0001	-0.3244
Age group	0.4999	0.0001	0.4013
Occupation1			
Occupation2	-0.3330	0.0330	-0.0903
Income1			
Income2			
Household size	0.1619	0.0014	0.1356
Area of residence			

Therefore, a comparison of the each ANOVA result and its corresponding logistic regression result in this sub-section shows that the two results are the same in most occasions. Differences in results are found only in British Internet shopping, Taiwanese Internet shopping, and British hypermarket/superstore shopping. It is therefore fairly acceptable to use only one of the two results for the sake of simplicity. This is the approach taken in the next Chapter when some conclusions are drawn from the results in this sub-section.

5.4.1.2 Consumption trends

This sub-section covers the analysis of two consumption trends – convenience trend and health trend for Britain and Taiwan respectively. As discussed in Chapter 4, since there is a problem relating household-level

purchase/consumption to individual-level segmentation variables, the same analysis for Britain will be conducted twice – one on the total sample and another on the single adult household sample.

Because each of the two consumption trends being studied is actually a composite of a number of different food products, frequency analysis will be first conducted in order to calculate the usage rate of each food product. Then the ANOVA test, acknowledging that the number of products representing a particular trend is an integer value, will be used to identify any significant variables that produced effects, *individually*, on the pursuit of the convenience or health trend. Results of the ANOVA test will be complemented by pairwise comparison test in order to identify the significance of any individual pair of levels of non-dichotomous demographic variables. Finally, Poisson regression analysis will be conducted on each of the two consumption trends so as to explore any effects, *simultaneously*, of hypothetical demographic variables. As was explained in Chapter 4, Poisson regression technique is tailored to a situation where the dependent variable shows a highly skewed distribution of count numbers, which has been found in Table 5.27 and Table 5.28 both indicating a skewness to the left of the distribution.

Table 5.27 – Percentage distribution of number of variety of convenience-oriented food products purchased/consumed within a Survey period

Number of convenience-oriented food products	Britain		Taiwan
	Total sample	Single adult household sample	
Zero	21.8	32.8	25.2
One	23.5	28.9	25.6
Two	20.4	19.1	18.8
Three	15.7	11.8	14.1
Four	9.1	5.1	8.9
Five	5.2	1.3	4.8
Six	2.6	0.8	1.5
Seven	1.0	0.1	1.3
Eight	0.5	0.1	0.0
Nine	0.2	0.0	0.0
Ten	0.1	0.0	0.0
Eleven	0.0	0.0	0.0

Table 5.28 – Percentage distribution of number of health-oriented food products purchased/consumed within a Survey period

Number of health-oriented food products	Britain		Taiwan
	Total sample	Single adult household sample	
Zero	17.6	27.7	21.2
One	28.3	33.3	32.2
Two	25.2	23.5	22.8
Three	17.6	10.5	14.1
Four	7.8	3.8	5.8
Five	2.6	1.0	2.8
Six	0.6	0.1	0.9
Seven	0.2	0.0	0.3

Convenience trend Nineteen food products, each of which is regarded as convenience-oriented by at least 70% of British sample (Chapter 4), are used to represent the trend in the food market context of Britain.

Table 5.29 shows that more than 10% of the total British sample have purchased/consumed eight of the nineteen food products during the Survey week. These are, in descending order, 'bacon and ham', 'baked beans', 'canned soup', 'cooked poultry', 'meat pies, pasties and puddings', 'other canned meat and canned meat products', 'ready meals', and 'takeaway ready meals'. However, only five of these eight more highly purchased/consumed convenience-oriented food products are found to exceed 10% cut-off points in the single adult household sample. Additionally, Table 5.10 clearly shows that the usage rate of each of all the nineteen food products is lower among single-adult households than total households. There is a divergence in the degree of pursuit of the convenience trend between the two samples, signifying the appropriateness of presenting results for both of them in order to avoid any misleading conclusion.

Fewer food products, each of which is agreed by more than 70% of Taiwanese sample as convenience-oriented, are used in aggregate as a proxy for the trend in the Taiwanese food market context.

Table 5.30 shows that, among the seven convenience-oriented food products, canned fish is found to have the highest usage rate, with 47.8% of the Taiwanese sample having consumed it in the Survey month.

It has to be noted that the time span in which purchase/consumption has been recorded is different between the British and the Taiwanese Surveys. The former records purchase/consumption on a one-week basis, while the latter adopts a one-month basis. However, this will not impair the validity of analysis. The datasets of the two Surveys will not be pooled together for comparing usage rates between countries. Implications are drawn only by

interpreting results of intra-country analysis conducted separately on both Surveys.

Table 5.29 – Usage rate (%) of different convenience-oriented food products in Britain

Product	Total sample	Single adult household sample
Bacon and ham, cooked, including canned	36.0	23.3
Cooked poultry, not purchased in cans	17.6	11.2
Takeaway cooked poultry	2.0	1.4
Other cooked meat, not purchased in cans	7.7	5.3
Other canned meat and canned meat products	12.6	9.1
Meat pies, ready to eat	9.0	5.2
Sausage rolls, ready to eat	5.1	2.5
Pate	3.9	1.7
Delicatessen type sausages	5.4	2.4
Meat pastes and spreads	2.3	1.5
Meat pies, pasties and puddings	14.1	10.9
Takeaway meat pies, pasties and puddings	1.3	0.7
Ready meals	12.0	8.6
Takeaway ready meals	11.2	6.7
Fish, cooked	7.3	5.9
Takeaway fish products	2.0	1.2
Baked beans in sauce	27.9	19.0
Other canned beans and pulses	5.2	3.5
Soups, canned	19.9	15.6

Table 5.30 – Usage rate (%) of different convenience-oriented food products in Taiwan

Product	Total sample
Canned fish	47.8
Broth	33.2
Soup powdered	27.0
Soup, pour in water and ready to eat	16.8
Three-in-one coffee	26.8
Three-in-one wheat flake	23.1
Malt, chocolate or cocoa drink, ready to drink (individual pack)	7.9

Tests of significance of each demographic variable in relation to the pursuit of the convenience trend in the food market are conducted on three samples – British total sample, British single adult household sample, and Taiwanese sample. Results are shown in Table 5.31.

Table 5.31 - Demographic structure of convenience-oriented food users in Britain and Taiwan

Variable	Category	Britain		Taiwan
		Total sample	Single adult household sample	
Gender	**Overall test of significance**	*****	-	*****
	Male	2.21	1.35	1.67
	Female	1.48	1.36	1.98
Age group	**Overall test of significance**	*****	-	*****
	Aged 15-20	1.38	1.30	2.05
	Aged 21-30	1.71	1.39	1.81
	Aged 31-40	2.28	1.54	2.12
	Aged 41-50	2.41	1.50	1.80
	Aged 51-60	2.20	1.31	1.41
	Aged 61-70	1.81	1.38	1.06
Occupation	**Overall test of significance**	*****	****	***
	Employer, manager or professional	2.20	1.10	2.03
	Clerical or manual	2.26	1.42	1.71
	Economically inactive	1.66	1.35	1.87
Income	**Overall test of significance**	*****	*****	*****
	High income	1.90	1.27	2.10
	Middle income	2.16	1.26	1.90
	Low income	2.02	1.53	1.62
Household size	**Overall test of significance**	*****	*****	***
	One	1.23	1.23	1.23
	Two	1.91	1.73	1.54
	Three	2.54	2.24	1.61
	Four	2.69	1.61	1.96
	Five	2.89	2.14	1.92
	Six	2.70	3.00	1.86
	Seven or more	2.00		1.78
Region of residence	**Overall test of significance**	*****	*****	*****
	Capital	1.62	1.05	2.42
	Non-capital	2.07	1.40	1.72

***** significant at 99% confidence level; **** significant at 95% confidence level ; *** significant at 90% confidence level; ** significant at 80% confidence level; * significant at 70% confidence level; - not significant at 70% confidence level

As shown, all the demographic variables are found to be very significant, at 99% confidence level, in affecting the number of convenience-oriented food products purchased/consumed for the British total sample. As

purchase/consumption data on the sample were collected at household basis, results with household level variables should have greater validity than those with individual level variables. Three of the six demographic variables – income (per capita family income), household size, and region of residence – are of household level. Table 5.31 shows that, in Britain, a smaller variety of convenience-oriented food products have been purchased/consumed by higher income, smaller or London households.

To complement the *overall* significance results shown in Table 5.31, *pairwise* significant tests that compare level to level of the same variable in their relationship to the purchase/consumption of convenience-oriented food products have been conducted. Results are shown in Table 5.32. Significant differences are found between each level of the income variable. Many significant pairwise differences are also found for the household size variable.

Table 5.32 – Pairwise comparison of convenience-oriented food product consumption in Britain (all household sample) for all levels within each considered variable

Gender	Male	Female
Male		*
Female		

Age	Aged 15-20	Aged 21-30	Aged 31-40	Aged 41-50	Aged 51-60	Aged 61-70
Aged 15-20		-	*	*	*	-
Aged 21-30			*	*	*	-
Aged 31-40				-	-	*
Aged 41-50					*	*
Aged 51-60						*
Aged 61-70						

Occupation	Employer, manager or professional	Clerical or manual	Economically inactive
Employer, manager or professional		-	*
Clerical or manual			*
Economically inactive			

Income	High income	Medium income	Low income
High income		*	*
Medium income			*
Low income			

Household size	One	Two	Three	Four	Five	Six	Seven or more
One		*	*	*	*	*	*
Two			*	*	*	*	-
Three				-	*	-	-
Four					-	-	*
Five						-	*
Six							*
Seven or more							

Region of Residence	Capital	Non-capital
Capital		*
Non-capital		

Note: * significant at 95% confidence level; - non-significant at 95% confidence level

Table 5.31 and Table 5.32 consider the relationship of each demographic variable in isolation to convenience food consumption. However, individual demographic variables may influence each other during the course of their

impact on the consumption of convenience foods. For example, it is possible that people living in London earns higher per capita income on average than people living elsewhere. Considering either the 'region of residence' variable or the income variable alone may lead to less precise results. Therefore, Poisson regression, which provides the facility to examine the effect of a number of independent variables simultaneously on the dependent variable that is a count number, is used. Results as in Table 5.33, indicating that a greater variety of these food products are purchased/consumed by people from middle income background, larger households, and non-London area, are consistent with results obtained when each demographic variable is considered in isolation (Table 5.31).

Table 5.33 – Poisson regression analysis of British (total sample) convenience-oriented food product purchase/consumption

Parameter	Coefficient	Chi-square		Probability>Chi-square	
		Before	After	Before	After
Intercept	-0.0794	2.1069	1.5455	0.1466	0.2138
Gender	0.1787	37.7070	27.6591	0.0001	0.0001
Age group	0.0445	27.3742	20.0797	0.0001	0.0001
Occupation1	0.0464	1.7529	1.2858	0.1855	0.2568
Occupation2	0.1278	20.8436	15.2893	0.0001	0.0001
Income1	-0.0139	0.2279	0.1672	0.6331	0.6826
Income2	0.0641	7.0424	5.1658	0.0080	0.0230
Household size	0.1543	324.3940	237.9519	0.0001	0.0001
Region of residence	-0.2280	39.7826	29.1816	0.0001	0.0001

Number of observations = 5,052

Concerning the British single-adult household sample, only the three personal variables – gender, age, and occupation – are analyzed. Table 5.31 above shows that one of these three variables – occupation - is significant at 95% or higher confidence level. Gender and age do not account for the convenience trend in the British single-adult household food market.

Pairwise comparison tests in Table 5.34 show that significant differences occur between 'employer, manager or professional' and 'clerical and manual', and between 'employer, manager or professional' and 'economically inactive'. 'Employer, manager or professional' in single-adult households are particularly likely to purchase/consume convenience-oriented food products.

Table 5.34 – Pairwise comparison of convenience-oriented food product consumption in Britain (single-adult household sample) for all levels within each considered variable

Gender	Male	Female
Male		-
Female		

Age	Aged 15-20	Aged 21-30	Aged 31-40	Aged 41-50	Aged 51-60	Aged 61-70
Aged 15-20		-	-	-	-	-
Aged 21-30			-	-	-	-
Aged 31-40				-	-	-
Aged 41-50					-	-
Aged 51-60						-
Aged 61-70						

Occupation	Employer, manager or professional	Clerical or manual	Economically inactive
Employer, manager or professional		*	*
Clerical or manual			-
Economically inactive			

Income	High income	Medium income	Low income
High income		-	*
Medium income			*
Low income			

Household size	One	Two	Three	Four	Five	Six	Seven or more
One		*	*	*	-	*	-
Two			*	-	-	-	-
Three				*	-	-	-
Four					-	-	-
Five						-	-
Six							-
Seven or more							

Region of Residence	Capital	Non-capital
Capital		*
Non-capital		

Note: * significant at 95% confidence level; - non-significant at 95% confidence level

A Poisson regression analysis shows that all the three personal variables analyzed simultaneously do not significantly influence the purchase/consumption of convenience-oriented food products among British

single adult households (Table 5.35). This is different from the ANOVA result where occupation is found to be significant. If household variables are considered, household size and region of residence emerge as significant variables. Heavier purchase/consumption accrues to single adults from larger households and non-London area. These findings are similar to those found in the case of Poisson regression modeling of the total sample, except that among the single adult households, income is no longer a significant variable influencing convenience food consumption.

Table 5.35 – Poisson regression analysis of British (single adult household sample) convenience-oriented food product purchase/consumption

Parameter	Coefficient	Chi-square		Probability>Chi-square	
		Before	After	Before	After
Intercept	-0.0586	0.2461	0.1915	0.6198	0.6617
Gender	0.0780	2.2651	1.7624	0.1323	0.1843
Age group	0.0302	2.9702	2.3110	0.0848	0.1285
Occupation1	-0.1732	3.0489	2.3723	0.0808	0.1235
Occupation2	0.0303	0.3068	0.2387	0.5796	0.6251
Income1	0.0741	1.2100	0.9415	0.2713	0.3319
Income2	-0.0746	1.2369	0.9624	0.2661	0.3266
Household size	0.1889	44.0743	34.2925	0.0001	0.0001
Region of residence	-0.3079	16.0646	12.4992	0.0001	0.0004

Number of observations = 1,381

In Taiwan, demographic variables in aggregate produced significant effects on the variety of convenience foods consumed, as shown in Table 5.31 above. The female were heavier followers of the convenience trend. Income and region of residence were the other two effective segmentation variables. Unlike the case in Britain, convenience foods are more heavily consumed by people with higher income or living in the capital city in Taiwan. Occupation and household size also exerted significant, albeit smaller in scale, effects. Convenience food takers were likely to engage in non-clerical or non-manual work, and have a bigger family.

Table 5.36 shows that significant differences were found between every age group beyond the age of 50 and every age group below 50. So people aged above 50 consumed a narrower variety of convenience foods that people aged below 50. No significant difference was found between 'clerical or manual' and 'economically inactive', signifying the inappropriateness to occupationally segment between the two. People in the lowest one-third income category consumed a smaller number of convenience foods as against either the highest income or the medium income category.

Table 5.36 – Pairwise comparison of convenience-oriented food product consumption in Taiwan for all levels within each considered variable

Gender	Male	Female
Male		*
Female		

Age	Aged 15-20	Aged 21-30	Aged 31-40	Aged 41-50	Aged 51-60	Aged 61-70
Aged 15-20		-	-	-	*	*
Aged 21-30			*	-	*	*
Aged 31-40				*	*	*
Aged 41-50					*	*
Aged 51-60						-
Aged 61-70						

Occupation	Employer, manager or professional	Clerical or manual	Economically inactive
Employer, manager or professional		*	-
Clerical or manual			-
Economically inactive			

Income	High income	Medium income	Low income
High income		-	*
Medium income			*
Low income			

Household size	One	Two	Three	Four	Five	Six	Seven or more
One		-	-	*	*	-	-
Two			-	*	-	-	-
Three				*	-	-	-
Four					-	-	-
Five						-	-
Six							-
Seven or more							

Region of Residence	Capital	Non-capital
Capital		*
Non-capital		

Note: * significant at 95% confidence level, - non-significant at 95% confidence level

A Poisson regression analysis shows that all the considered demographic variables exert coordinated significant impacts on convenience food consumption in Taiwan (Table 5.37). This finding is similar to that found

when each demographic variable is considered in isolation, and therefore confirms that the convenience food market is more effectively segmented by demographics in Taiwan than in Britain.

Table 5.37 – Poisson regression analysis of Taiwanese convenience-oriented food product consumption

Parameter	Coefficient	Chi-square		Probability>Chi-square	
		Before	After	Before	After
Intercept	0.8284	76.2052	54.2070	0.0001	0.0001
Gender	-0.2121	18.7575	13.3428	0.0001	0.0003
Age group	-0.0893	32.3241	22.9931	0.0001	0.0001
Occupation1	0.1857	6.1628	4.3837	0.0130	0.0363
Occupation2	-0.0228	0.1953	0.1390	0.6585	0.7093
Income1	-0.2937	28.4210	20.2167	0.0001	0.0001
Income2	-0.1176	3.7555	2.6714	0.0526	0.1022
Household size	0.0492	9.9967	7.1109	0.0016	0.0077
Region of residence	0.3230	34.5584	24.5824	0.0001	0.0001

Number of observations = 1,178

Health trend Eleven food products, each of which has been agreed by at least 70% of the British sample as health-oriented, are taken, in aggregate, as a proxy for the health trend.

Table 5.38 shows that six of these eleven food products have been each purchased/consumed by at least 10% of the total British sample in a Survey week. These are, in descending order, 'semi and other skimmed milk', 'yoghurt', 'other high fibre breakfast cereals', 'reduced fat spreads', 'sliced wholemeal bread', and 'fully skimmed milk'. As in the case of convenience-oriented food products, the usage rate of each of the eleven food products is higher for the total sample than the single adult household sample.

Seven food products are chosen by more than 70% of the Taiwanese sample as health-oriented. Accordingly, these products as a whole are used to represent the health trend in Taiwanese food market.

In Taiwan, among the seven health-oriented food products, fat free/low fat fresh milk is recorded the highest in usage rate, with nearly 70% of the sample having consumed it in the Survey month (Table 5.39).

Table 5.38 – Usage rate (%) of different health-oriented food products in Britain

Product	Total sample	Single adult household sample
Yoghurt	33.7	23.1
Fully skimmed milk	12.5	9.7
Semi and other skimmed milk	55.7	45.1
Reduced fat spreads	18.2	14.0
Low fat spreads	9.7	5.7
Vegetable juice	3.9	2.1
Bread, wholemeal, sliced	14.5	11.9
Bread, wholemeal, unsliced	4.5	3.7
Oatmeal and oat products	3.9	2.6
Muesli	3.5	2.4
Other high fibre breakfast cereals	20.8	12.6

Table 5.39 – Usage rate (%) of different health-oriented food products in Taiwan

Product	Total sample
Fresh milk (including flavoured) (fat free or low fat)	68.9
Condensed fermented milk	30.0
Solidified fermented milk	15.3
Breakfast cereal	13.8
Pure fruit and / or vegetable juice	29.3
Linchi	2.5
Lecithin	4.6

The health trend represented by respective food products as described above in each of the two countries has been tested for any significant difference by each demographic variable chosen. This type of test has been conducted on each of the three samples as shown in Table 5.40.

Table 5.40 - Demographic structure of health-oriented food users in Britain and Taiwan

Variable	Category	Britain		Taiwan
		Total sample	Single adult household sample	
Gender	**Overall test of significance**	*****	*****	*****
	Male	1.91	1.13	1.42
	Female	1.50	1.43	1.88
Age group	**Overall test of significance**	*****	*****	*****
	Aged 15-20	1.09	0.97	1.98
	Aged 21-30	1.34	1.12	1.70
	Aged 31-40	1.90	1.35	1.79
	Aged 41-50	1.95	1.51	1.67
	Aged 51-60	1.96	1.25	1.14
	Aged 61-70	1.91	1.45	0.97
Occupation	**Overall test of significance**	*****	-	***
	Employer, manager or professional	2.12	1.25	1.68
	Clerical or manual	1.82	1.31	1.53
	Economically inactive	1.66	1.35	1.73
Income	**Overall test of significance**	*****	-	*****
	High income	1.88	1.37	1.85
	Middle income	1.88	1.37	1.69
	Low income	1.65	1.29	1.49
Household size	**Overall test of significance**	*****	**	***
	One	1.29	1.29	1.27
	Two	1.88	1.46	1.41
	Three	1.99	1.53	1.53
	Four	2.14	1.41	1.79
	Five	2.23	1.57	1.70
	Six	2.04	1.67	1.68
	Seven or more	1.53		1.51
Region of residence	**Overall test of significance**	*****	-	*****
	Capital	1.65	1.30	2.15
	Non-capital	1.83	1.33	1.55

***** significant at 99% confidence level; **** significant at 95% confidence level ; *** significant at 90% confidence level; ** significant at 80% confidence level; * significant at 70% confidence level; - not significant at 70% confidence level

For the British total sample, results relating to individual-level variables – gender, age group, and occupation – are liable to error because purchase/consumption data that contribute to the quantification of the health

trend have been collected at household-level basis. So, as is in the case of the convenience trend, only the results relating to household-level variables have been examined. Table 5.40 shows that all the three household-level variables are found to pose significant impacts on the pursuit of the health trend.

Table 5.40 highlights whether a demographic variable is significant as a whole. For more details about significant differences between levels of the same variable that contain more than two levels, a pairwise comparison test has been conducted. Concerning the income variable, there is no significant difference between the highest one-third and the medium one-third with regard to the variety of health-oriented food products purchased/consumed. With regard to household size, significant differences are found between many different levels.

Table 5.41 – Pairwise comparison of health-oriented food product consumption in Britain (all household sample) for all levels within each considered variable

Gender	Male	Female
Male		*
Female		

Age	Aged 15-20	Aged 21-30	Aged 31-40	Aged 41-50	Aged 51-60	Aged 61-70
Aged 15-20		-	*	*	*	*
Aged 21-30			*	*	*	*
Aged 31-40				-	-	-
Aged 41-50					-	-
Aged 51-60						-
Aged 61-70						

Occupation	Employer, manager or professional	Clerical or manual	Economically inactive
Employer, manager or professional		*	*
Clerical or manual			*
Economically inactive			

Income	High income	Medium income	Low income
High income		-	*
Medium income			*
Low income			

Household size	One	Two	Three	Four	Five	Six	Seven or more
One		*	*	*	*	*	-
Two			*	*	*	-	-
Three				*	*	-	*
Four					-	-	*
Five						-	*
Six							*
Seven or more							

Region of Residence	Capital	Non-capital
Capital		*
Non-capital		

Note: * significant at 95% confidence level, - non-significant at 95% confidence level

A Poisson regression analysis shows that a significantly greater variety of health-oriented food products are purchased/consumed by people who are in higher or middle income category, from larger households, and living in

non-London area (Table 5.42). So the same demographic variables are found significant in both ANOVA test and Poisson regression analysis.

Table 5.42 – Poisson regression analysis of British (total sample) health-oriented food product purchase/consumption

Parameter	Coefficient	Chi-square		Probability>Chi-square	
		Before	After	Before	After
Intercept	-0.1472	6.2837	6.7290	0.0122	0.0095
Gender	0.0351	1.3764	1.4739	0.2407	0.2247
Age group	0.0941	106.2988	113.8309	0.0001	0.0001
Occupation1	0.1561	18.3446	19.6445	0.0001	0.0001
Occupation2	0.0689	5.3370	5.7152	0.0209	0.0168
Income1	-0.1527	23.6799	25.3578	0.0001	0.0001
Income2	-0.0278	1.1765	1.2599	0.2781	0.2617
Household size	0.1233	172.8629	185.1117	0.0001	0.0001
Region of residence	-0.1115	9.1766	9.8268	0.0025	0.0017

Number of observations = 5,052

For the British single-adult household sample, Table 5.40 above shows that, among individual-level variables, only gender and age are found to be significant variables. Female single-adult households are more prone to purchase or consume health-oriented food products than their male counterparts. Older single-adult households, aged more than 30, are more likely to be followers of health trend.

Pairwise comparison tests in Table 5.43 show that although significant differences occurred between many different levels of the age variable, the pattern of such differences is not systematic. Therefore, segmentation by age may not be effective.

Table 5.43 – Pairwise comparison of health-oriented food product consumption in Britain (single-adult household sample) for all levels within each considered variable

Gender	Male	Female
Male		*
Female		

Age	Aged 15-20	Aged 21-30	Aged 31-40	Aged 41-50	Aged 51-60	Aged 61-70
Aged 15-20		-	-	*	-	*
Aged 21-30			*	*	-	*
Aged 31-40				-	-	-
Aged 41-50					*	-
Aged 51-60						*
Aged 61-70						

Occupation	Employer, manager or professional	Clerical or manual	Economically inactive
Employer, manager or professional		-	-
Clerical or manual			-
Economically inactive			

Income	High income	Medium income	Low income
High income		-	-
Medium income			-
Low income			

Household size	One	Two	Three	Four	Five	Six	Seven or more
One		-	*	-	-	-	-
Two			-	-	-	-	-
Three				-	-	-	-
Four					-	-	-
Five						-	-
Six							-
Seven or more							

Region of Residence	Capital	Non-capital
Capital		-
Non-capital		

Note: * significant at 95% confidence level; - non-significant at 95% confidence level

A Poisson regression analysis shows that gender and age group are significant individual-level variables (Table 5.44). These results, compared to their counterparts found in ANOVA test, suggest that the individual-level demographic variable set, which significantly affect consumer choice of

health-oriented food products among British single adult households, is the same in its context between considering each demographic variable in isolation and considering all the hypothetical demographic variables simultaneously.

Table 5.44 – Poisson regression model of British (single adult household sample) health-oriented food product consumption

Parameter	Coefficient	Chi-square		Probability>Chi-square	
		Before	After	Before	After
Intercept	-0.0323	0.0664	0.0665	0.7966	0.7965
Gender	-0.2691	24.2543	24.2722	0.0001	0.0001
Age group	0.0714	15.0186	15.0297	0.0001	0.0001
Occupation1	0.0025	0.0007	0.0007	0.9792	0.9792
Occupation2	0.0536	0.8565	0.8571	0.3547	0.3545
Income1	-0.1367	3.7098	3.7125	0.0541	0.0540
Income2	-0.0424	0.4150	0.4154	0.5194	0.5193
Household size	0.1044	10.4031	10.4108	0.0013	0.0013
Region of residence	-0.0086	0.0145	0.0145	0.9042	0.9042

Number of observations = 1,381

For the Taiwan sample, four of the six demographic variables are overall very significant at 99% confidence level, as shown in Table 5.40. People who consume a greater variety of health-oriented food products are more likely to be female, aged younger, earn higher income, and resident in Taipei city. Occupation and household size are significant at 90% confidence level.

Table 5.45 provides further insights about the overall significance results. Specifically, people aged above 50 form a homogeneous group who are less likely to consume health-oriented food products. In occupation, a significant difference occurs only between 'clerical or manual' and 'economically inactive'. In income, no difference has been found between 'high' and 'medium'. This implies that the split-off point in terms of the pursuit of health trend is between high/medium and low income, rather than between high and medium/low income. In household size, a significant difference

occurs only between 'four' and 'seven or more', with the former more likely to consume health-oriented food products.

Table 5.45 – Pairwise comparison of health-oriented food product consumption in Taiwan for all levels within each considered variable

Gender	Male	Female
Male		*
Female		

Age	Aged 15-20	Aged 21-30	Aged 31-40	Aged 41-50	Aged 51-60	Aged 61-70
Aged 15-20		*	-	*	*	*
Aged 21-30			-	-	*	*
Aged 31-40				-	*	*
Aged 41-50					*	*
Aged 51-60						-
Aged 61-70						

Occupation	Employer, manager or professional	Clerical or manual	Economically inactive
Employer, manager or professional		-	-
Clerical or manual			*
Economically inactive			

Income	High income	Medium income	Low income
High income		-	*
Medium income			*
Low income			

Household size	One	Two	Three	Four	Five	Six	Seven or more
One		-	-	-	-	-	-
Two			-	*	-	-	-
Three				-	-	-	-
Four					-	-	*
Five						-	-
Six							-
Seven or more							

Region of Residence	Capital	Non-capital
Capital		*
Non-capital		

Note: * significant at 95% confidence level; - non-significant at 95% confidence level

A Poisson regression analysis shows that gender, age group, occupation, income, and region of residence are significant variables (Table 5.46). These results are generally consistent with those found in ANOVA test, except that occupation is not significant when considered in isolation but significant when considered simultaneously with other hypothetical demographic variables.

Table 5.46 – Poisson regression model of Taiwanese health-oriented food product consumption

Parameter	Coefficient	Chi-square		Probability>Chi-square	
		Before	After	Before	After
Intercept	0.9449	90.2963	84.6320	0.0001	0.0001
Gender	-0.3220	38.9777	36.5326	0.0001	0.0001
Age group	-0.1145	47.0042	44.0556	0.0001	0.0001
Occupation1	0.1650	4.1662	3.9048	0.0412	0.0481
Occupation2	0.0013	0.0006	0.0005	0.9808	0.9814
Income1	-0.2264	15.1579	14.2070	0.0001	0.0002
Income2	-0.0905	1.9725	1.8487	0.1602	0.1739
Household size	0.0198	1.4605	1.3689	0.2269	0.2420
Region of residence	0.3172	29.8877	28.0128	0.0001	0.0001

Number of observations = 1,178

Relationship between convenience and health trends Throughout the study, convenience and health trends are analyzed separately. However, as both trends are popular in Britain and also in Taiwan, it is tempting to examine whether there is any relationship between these two trends. In other words, a question arises as to whether a person who consumes a greater variety of convenience-oriented foods takes a higher or lower number of health-oriented foods. The two trends are each represented by a count number of corresponding products consumed. In a way this count number can be viewed as rank number, i.e. a person consuming 11 different convenience foods is in a higher rank of the convenience trend than another person consuming less variety of convenience foods. So Spearman correlation

analysis is used for exploring the relationship between convenience and health trends.

Results, as shown in Table 5.47 indicate that, in each of all the three samples – British total sample, British single adult household sample, and Taiwanese sample – convenience and health trends, at individual level of analysis, are positively related to each other. Such relationship is found statistically significant. People who pursue the convenience trend also follow the health trend.

However, the strength of the relationship varies between samples. The strongest relationship rests in the Taiwanese sample, signifying a greater likelihood for the same group of people to pursue both convenience and health trends in Taiwan than in Britain. The correlation coefficient of British single household sample is, though significant, only 0.1631. So in this particular social group, convenience-oriented food takers and health-oriented food takers are more likely to be different people than an average person in Britain.

Table 5.47 - Spearman correlation analysis of convenience and health trends

	Britain		Taiwan
	Total sample	Single adult household sample	
Correlation coefficient	0.2744	0.1631	0.4655
Probability>correlation coefficient	0.0001	0.0001	0.0001
Number of observations	5,973	1,856	1,200

5.4.2 Inter-country analysis

The second stage of analysis – inter-country analysis – attempts to identify any macro-based difference of each retail format between countries. Consumption trends will not be analysed in this stage because their corresponding datasets are not comparable.

Results of inter-country analysis for the Internet, the hypermarket/superstore, the supermarket, and the traditional market are shown in Table 5.48. As shown, in the Survey year of 1998, the usage rate of the Internet was higher in Britain than in Taiwan. By contrast, the usage rates of all the other three retail formats were lower in Britain than in Taiwan.

Contingency tests have been undertaken to identify whether the difference in usage rates for each of the retail formats are statistically significant. Results show that the difference is not significant, and therefore is due to sampling error only, for the Internet and the supermarket. On the other hand, significant inter-country differences are found for the hypermarket/superstore and the traditional market.

So by using the country as the level of analysis and without considering any intra-country variable, country difference does not exist for the use of the Internet and the supermarket for shopping. However, this type of analysis does not take into account any other real life factors, such as demographic factors, that are supposed to impact on individual choice of retail channels. It will be shown that half of the results in Table 5.48 are overthrown by the results of pan-country analysis to be conducted in the next section.

Table 5.48 - Inter-country analysis of Internet, hypermarket/superstore, supermarket, and traditional marketing shopping

	Internet	Hypermarket/ superstore	Supermarket	Traditional market
Usage rate				
Britain	1.8	40.3	69.8	20.2
Taiwan	0.8	51.7	71.2	77.6
Observations used	1823	1822	1823	1823
Contingency coefficient	0.017	0.108	0.014	0.483
Approximate significance	0.469	0.000	0.550	0.000
Macro-based inter-country difference	No	Yes	No	Yes

As mentioned in Chapter 1, the Internet, which catches the greatest attention and probably offers the highest growth potential among all the retail formats in the contemporary society, will be analyzed in greater detail. Accordingly, this format has been additionally analyzed product by product. This contributes to the study in three ways. First, it helps to identify which types of products are more receptive to Internet shopping in one country compared to another country. Second, cross-national consumer segments of the Internet, if found, can be identified with greater precision because each individual product type, rather than Internet shopping in general, is the target of segmentation. Third, the relative importance of the global technology dimension and the national culture dimension can be assessed in a more detailed fashion. The former dimension may prevail over the latter dimension in the case of one product, but the reverse is true in the case of another product.

Altogether eighteen product types, besides 'Others', have been analyzed. Table 5.49 shows that, without involving statistical testing, the usage rates of Internet shopping for sixteen of the eighteen products are higher in Britain

than in Taiwan. Yet if statistical testing is involved, only three of these sixteen products – clothes, music/CDs, and books - are significantly different at 95% confidence level between Britain and Taiwan. As 25% to 50% of the cells in the cross table for calculating the chi-square value in the case of clothes have expected counts less than 5, the result of statistical testing may not be accurate. Therefore, only two product types – music/CDs and books – have been found to be statistically and accurately different between the two countries.

Table 5.49 - Internet shopping in Britain and Taiwan

Product type	Britain (% of total population)	Taiwan (% of total population)	Chi-Square	Probability>Chi-Square
Groceries/food*	0.54	0.30	0.834	0.361
Clothes*	0.40	0.00	4.029	0.045
Jewelry*	0.04	0.00	0.447	0.504
Toy/games*	0.22	0.20	0.017	0.895
Music/CDs	**0.89**	**0.10**	**6.749**	**0.009**
Videos*	0.13	0.00	1.341	0.247
Books	**1.74**	**0.50**	**7.949**	**0.005**
Sports equipment*	0.04	0.10	0.343	0.558
Furniture*	0.04	0.00	0.447	0.504
Electronics*	0.27	0.20	0.129	0.719
PC hardware*	0.54	0.10	3.284	0.070
PC software*	0.49	0.10	2.865	0.091
Business travel*	0.13	0.00	1.341	0.247
Holiday leisure travel*	0.36	0.00	3.580	0.058
Tickets*	0.45	0.20	1.138	0.286
Toiletries/cosmetics*	0.00	0.10	2.241	0.134
Stocks/mutual funds*	0.09	0.20	0.687	0.407
Cars*	0.04	0.00	0.447	0.504
Others*	0.54	0.40	0.259	0.611

*25%-50% of the cells in the cross table for calculating the chi-square value have expected counts less than 5. Therefore, the chi-square value may not be accurate.

5.4.3 Pan-country analysis

In this final stage of analysis of the study, comparable data from Britain and Taiwan are combined to examine the relative importance of intra-country

variables and the between-country variable in affecting the use of each retail format being studied. So the main spotlight of the analysis is shed on '*country*'. In a sense this stage of analysis is a culmination of the preceding two stages of analysis. Intra-country variables, focus of the first stage, and between-country variable, focus of the second stage, will be simultaneously examined for their influence on the usage of each retail format being studied.

This stage of analysis will cover two parts – *static* and *dynamic*. These two terms are used conceptually for accommodating the time dimension in the analysis, rather than technically such as has been interpreted in the statistics or management science discipline. For this study, the static part is concerned with pan-country analysis of the four retail formats – the Internet, the hypermarket/superstore, the supermarket, and the traditional market – over a static time period. The dynamic part concentrates on the Internet, and attempts to identify whether the relative importance of intra-country variables and the between-country variable changes over time in affecting Internet use for shopping.

In attempting pan-country analysis, static or dynamic, three technical questions arise that will influence the outcome of the analysis.

The first question is about whether the forward stepwise selection approach, which is appropriate for predictive analysis (Menard 1995), should be used in deriving the final regression model. The approach uses the log likelihood ratio as the deletion criterion for the variables in the model, and uses the score statistic for the inclusion of variables. The default level for entry in the model is 0.05 significance level and any variable with a significance level of less than this is entered in the model. This default implies that there is less

than 5 percent chance that the coefficient of these variables is zero and that they do not contribute to the model. In this way, the null hypothesis that the coefficient of each variable included in the final model is equal to zero can be rejected. In contrast, Lund and Derry (1982) suggested some advantages of keeping all the hypothetical variables in the final model, including the provision of the base for the evaluation of both the statistical significance of each independent variable and the patterns of variations within all these variables.

This study uses both approaches depending on the situation so as to exploit the advantages of each approach. Specifically, the *reduced model* derived from the forward stepwise selection approach is adopted in situations where a regression model is interpreted in its own right. A set of significant variables generated through this approach is more robust. When regression models are compared to each other, the *full model* that comprises all the postulated variables is chosen, so that the relative influence of each segmentation variable across the regression models can be detected.

The second question is about whether interaction terms, i.e. a term that combines two of the original segmentation variables, should be used in the analysis. If used, there will be 34 more segmentation variables, as shown in Table 5.50, in the hypothetical regression model. The model will be much more complicated, and any significant interaction term may be difficult to explain. A preliminary run of four static pan-country regression models each including 34 additional interaction terms is conducted in order to statistically examine the difference between a model excluding interaction terms and one including interaction terms. Two statistics are used. First is the magnitude of decrease from initial –2 log-likelihood to final –2 log-

likelihood, which signify the extent of improvement of model fit because of the inclusion of the independent variables in the final model. Second is the max-rescaled RSquare, which indicates the explanatory power of the independent variables.

Table 5.50 – Identification of significant interaction terms in regression models

	Internet	Hypermarket/ superstore	Supermarket	Traditional market
Intercept				
Gender (Gender)				
Age group (Age)				
Occupation1 (Occ1)				
Occupation2 (Occ2)				
Income1 (Inc1)				
Income2 (Inc2)				
Household size (Hhsize)				
Region of residence (Region)				
Country of residence (Country)				
Gender*age (A)				
Gender*occ1 (B)				
Gender*occ2 (C)				
Gender*inc1 (D)				
Gender*inc2 (E)				✓
Gender*hhsize (F)				
Gender*region (G)				
Gender*country (H)				✓
Age*occ1 (I)				✓
Age*occ2 (J)				
Age*inc1 (K)				
Age*inc2 (L)				
Age*hhsize (M)				✓
Age*region (N)				
Age*country (O)				✓
Occ1*inc1 (Q)				
Occ1*inc2 (R)				
Occ1*hhsize (S)				
Occ1*region (T)	✓			
Occ1*country (U)				
Occ2*inc1 (V)				
Occ2*inc2 (W)				
Occ2*hhsize (X)	✓			
Occ2*region (Y)				
Occ2*country (Z)				
Inc1*hhsize (AB)			✓	
Inc1*region (AC)				
Inc1*country (AD)			✓	
Inc2*hhsize (AE)				
Inc2*region (AF)				
Inc2*country (AG)			✓	
Hhsize*region (AH)				
Hhsize*country (AI)			✓	
Capital*country (AJ)		✓		

✓ significant at 95% confidence level

Results as in Table 5.51 show that the difference in the magnitude of decrease from initial –2 log-likelihood to final –2 log-likelihood because of the inclusion of the 34 interaction terms is higher for the Internet and supermarket model than for the hypermarket/superstore and traditional market models. In the Internet models, the degree of improvement in model fit, in terms of percentage change of –2 log-likelihood, is 9.5% in the case of no interaction terms and 19.9% with interaction terms. In the supermarket models, the change is 2.8% with no interaction items and 6.2% with interaction terms. The corresponding figures are 4.1% and 5.4% in the hypermarket/superstore models, and 23.8% and 29.4% in the traditional market models.

Table 5.51 – Comparison of the performance of regression models excluding and including interaction terms

Retail format Regression model	Initial –2LL	Final –2LL	Max-rescaled RSquare
Internet			
Excluding interaction terms	271.564	245.758	0.1028
Including interaction terms	271.564	217.432	0.2137
Hypermarket/superstore			
Excluding interaction terms	2120.714	2032.748	0.0745
Including interaction terms	2120.714	2005.750	0.0965
Supermarket			
Excluding interaction terms	1827.432	1777.103	0.0464
Including interaction terms	1827.432	1713.406	0.1030
Traditional market			
Excluding interaction terms	1985.130	1512.870	0.3653
Including interaction terms	1985.130	1401.726	0.4361

The same patterns occur for max-rescaled RSquare, which shows a much larger interaction-term induced difference between excluding and including the 34 interaction terms for the Internet and the supermarket models.

The above analysis shows that inclusion of interaction terms seems to be, in statistical terms, much better for the Internet and supermarket models, but

not significantly better for the hypermarket/superstore and traditional market models. However, a scrutiny of the modelling process of the four static pan-country regressions shows that the problem of quasi-complete separation, which has been discussed in the earlier part of this Chapter, exists in both the Internet and supermarket models. So the improvement in model fit due to the inclusion of interaction terms for these two models is more illusionary than real. Table 5.50 also shows that if the 34 interaction terms are included in the modelling process, only a tiny proportion of them turn out to be significant in each model – 6% (2 divided by 34) for the Internet model, 3% (1 divided by 34) for the hypermarket/superstore model, 12% (4 divided by 34) for the supermarket, and 15% (5 divided by 34) for the traditional market. It is therefore decided to forgo the inclusion of interaction terms in the analysis for the sake of simplicity, easier explanation, avoiding quasi-complete separation problem, and cost-effectiveness. In this regard, Berenson, Levine and Goldstein (1983) suggested that the criterion of regression model building is *parsimony*, which refers to the inclusion of the fewest number of variables that permits an adequate interpretation of the response variable. More complex regression models are more likely to contain inter-correlated independent variables whose presence interferes with their interpretation.

The third question is whether standardized or unstandardized regression coefficients should be used in interpreting model results. According to Singh (1995), standardized regression coefficients have at least three advantages: interpretability, common metric, and emic comparison standard. The interpretability derives from the idea that, under some conditions, the square of the standardized coefficient is the variance explained in the dependent variable. The common metric argument draws from the

conversion of disparate regression estimates into a common metric irrespective of the scale utilized to measure the independent variables. Standardized regression coefficients also provide an emic comparison standard that results from the adjustment of the independent variables on the basis of within-sample variability. As such, the standardized coefficient, say $s\beta_1$, is obtained through multiplying the corresponding unstandardized coefficient, β_1, by a factor that represents the variability of the independent variable in question, say X_1, and the dependent variable, say Y, within the sample, i.e. standard deviation of X_1 divided by standard deviation of Y. On the other hand, Singh (1995) also noted three advantages of unstandardized regression coefficients: comparability across samples, structural invariance, and etic comparison standard. Tests on comparability across samples can only be conducted using unstandardized coefficients, rather than standardized coefficients, which, through the adjustment by within-group variability, in effect eliminate any across-group differences on account of disparate variances. The structural invariance reflects the notion that unstandardized coefficients are proxies of structural parameters that are likely to be statistically invariant for corresponding estimates derived from different samples, while the standardized coefficients are likely to show variations from sample to sample. Subject to the fulfilment of the condition of construct equivalence that allows direct comparability of measurement scales for cross-national samples, unstandardized coefficients are more appropriate than standardized counterparts for etic comparison because they have not been adjusted for within sample variability.

In order to reap the advantages of these two types of coefficients, this study uses both of them in appropriate places. As such, standardized coefficients are used when the influences of different variables are compared to each

other within the regression model, while unstandardized coefficients are adopted when the impacts of the same variable are compared to each other between different regression models.

5.4.3.1 Static pan-country analysis

This sub-section begins by identifying and comparing between variables that have significantly affected consumer choice of each retail format across Britain and Taiwan on the same year basis of 1998, which assists in accomplishing the two major research objectives of the study – identification of cross-national consumer segments if exist as well as assessment and comparison of the internationalisation capability and potential.

This sub-section starts, by using the reduce model approach and standardized coefficients, to identify significant variables affecting the choice of a particular retail format across Britain and Taiwan. The latter part of the sub-section evaluates the impact of each variable on consumer choice of different retail formats, which provide a quantitative basis for comparison of the same variable between retail formats. This complements the results of the former part of the sub-section, by highlighting those variables that are particularly influential in one retail format vis-à-vis others, and ranking the internationalisation capability and potential of the four retail formats. As the analysis involves comparisons between regression models, the full model approach and unstandardized coefficients are adopted.

Internet Table 5.52 shows that three variables are significantly influencing the use of the Internet for shopping across Britain and Taiwan. Internet shoppers are likely to be younger, be employers/managers/professionals, and living in Britain. Age is the only variable among all the intra-country

demographic variables considered that can rival against the country variable in influencing consumer choice of Internet shopping, as shown by the significance level of the parameter estimate and the magnitude of the standardized estimate of each. This refutes the finding of inter-country analysis in the previous part of this Chapter, that the usage rate of Internet shopping is not significantly different between Britain and Taiwan. In fact, if the country variable is considered alongside intra-country demographic variables, which reflects more truly the complexity of real life, the country variable will become significant. The log likelihood model chi-square value, at 18.844, is significant at 95% confidence level, which indicates a satisfactory improvement in model fit by including the three significant independent variables in the final model. A Hosmer and Lemeshow Goodness-of-fit test produces a chi-square value of 5.7702 and a probability value of 0.5668, signifying that the final model is acceptable.

Table 5.52 – Logistic regression results using forward selection of the Internet

Variable	Parameter estimate	Pr > chi-square	Standardized estimate
Constant	-2.9308	0.0001	.
Gender			
Age group	-0.5828	0.0012	-0.4658
Occupation1	0.9512	0.0515	0.1741
Occupation2			
Income1			
Income2			
Household size			
Area of residence			
Country of residence	1.1813	0.0045	0.2744
Number of observations	1,531		
Initial –2LL	271.564		
Final –2LL	252.720		
Model	18.844 (p=0.0003)		
Goodness of fit	5.7702 (p=0.5668)		
Max-rescaled RSquare	0.0753		

In the case of hypermarket/superstore choice as the dependent variable, Table 5.53 shows that four broad demographic variables - age, income, household size, and area of residence – produce significant effects. Specifically, hypermarket/superstore shoppers across the two countries are more likely to be younger, situated in the top one-third income category, come from a bigger household, and located in the capital city. The significance of the log-likelihood model chi-square value and the non-significance of the Hosmer-Lemeshow Goodness-of-fit chi-square value indicate that the final model is satisfactory and acceptable. The country variable is found non-significant and therefore excluded from the final model. This again refutes the corresponding finding of inter-country analysis conducted previously.

Table 5.53 – Logistic regression results using forward selection of the hypermarket/superstore

Variable	Parameter estimate	Pr > chi-square	Standardized estimate
Intercept	0.4604	0.0241	.
Gender			
Age group	-0.1697	0.0001	-0.1356
Occupation1			
Occupation2			
Income1	-0.7651	0.0001	-0.2105
Income2	-0.5221	0.0005	-0.1219
Household size	0.1057	0.0019	0.0991
Area of residence	0.6660	0.0001	0.1246
Country of residence			
Number of observations			
Initial –2LL	2120.714		
Final –2LL	2039.152		
Model	81.562		
Goodness of fit	8.1762 (p=0.4164)		
Max-rescaled RSquare	0.0692		

Table 5.54 shows that gender, age, income, and area of residence produce significant impacts on supermarket shopping. Supermarket shoppers are more likely to be female, younger, in the top one-third income category, and

living in the capital city. Results from the log-likelihood test and the Hosmer-Lemeshow Goodness-of-fit test show that the model is useful and acceptable. The country variable is excluded from the final model, signifying that whether the respondent lives in Britain or in Taiwan does not have any significant effect on whether he/she uses the supermarket.

Table 5.54 – Logistic regression results using forward selection of the supermarket

Variable	Parameter estimate	Pr > chi-square	Standardized estimate
Intercept	1.9819	0.0001	.
Gender	-0.3726	0.0014	-0.1024
Age group	-0.1806	0.0001	-0.1443
Occupation1			
Occupation2			
Income1	-0.5120	0.0003	-0.1409
Income2	-0.4200	0.0104	-0.0980
Household size			
Area of residence	0.4853	0.0093	0.0908
Country of residence			
Number of observations			
Initial –2LL	1827.432		
Final –2LL	1778.519		
Model	48.913 (p=0.0001)		
Goodness of fit	9.3242 (0.3157)		
Max-rescaled RSquare	0.0451		

Table 5.55 shows that gender, age, income, household size, and country of residence influence traditional market shopping across Britain and Taiwan. A shopper at the traditional market is more likely to be female, younger, drawn from a bigger household, resident in Taiwan, and less likely to be placed in the middle one-third income category. Among all these significant independent variables, the country variable is the most influential. The magnitude of its standardized coefficient is much greater than any of the other significant variables. The log-likelihood chi-square value is 468.378, which is statistically significant, indicates that the inclusion of these significant independent variables brings to a satisfactory improvement in the

modelling. Yet caution has to be taken that the data do not fit into the final model well, which is implied from a high chi-square value of Hosmer-Lemeshow Goodness-of-fit test.

Table 5.55 – Logistic regression results using forward selection of the traditiona l market

Variable	Parameter estimate	Pr > chi-square	Standardized estimate
Intercept	0.1564	0.5871	.
Gender	-0.7917	0.0001	-0.2176
Age group	0.3770	0.0001	0.3013
Occupation1			
Occupation2			
Income1			
Income2	-0.2975	0.0432	-0.0695
Household size	0.1140	0.0105	0.1069
Area of residence			
Country of residence	-2.8846	0.0001	-0.6701
Number of observations			
Initial –2LL	1985.130		
Final –2LL	1516.752		
Model	468.378 (p=0.0001)		
Goodness of fit	37.841 (p=0.0001)		
Max-rescaled RSquare	0.3628		

Table 5.56 combines key findings of Table 5.52 – Table 5.55, which ranks each significant variable by the magnitude of the corresponding standardized estimate for each model. This indicates clearly that the age group variable, which is significant for all the four static pan-country regression models, is important in consumer shopping behaviour in general across the two countries. With the exception of the traditional market, a younger person is more likely to patronize modern retail formats, including the Internet, hypermarket/superstore, and supermarket.

Table 5.56 - Ranking of significance of significant independent variables in four static pan-country regression models [1]

Rank	Internet	Hypermarket/superstore	Supermarket	Traditional market
1	Age group (-)	Income1 (-)	Age group (-)	Country of residence (-)
2	Country of residence (+)	Age group (-)	Income1 (-)	Age group (+)
3	Occupation1 (+)	Area of residence (+)	Gender (-)	Gender (-)
4		Income2 (-)	Income2 (-)	Household size (+)
5		Household size (+)	Area of residence (+)	Income2 (-)

[1] The sign in parenthesis indicates the direction of impact, i.e. positive or negative, of the independent variable on the dependent variable

The other important static pan-country variable is income. A positive income effect is very evident in the hypermarket/superstore and supermarket models: the higher the income, the more likely people will use these types of retail formats. Explanation is less straightforward in the case of the traditional market: no significant difference in propensity to use is found between the lower income group and the higher income group, but a significant difference occurs between the middle income group and the higher income group, with the latter expressing a higher propensity to use. So a negative income effect is absent. Specifically, the lower income group do not use more of the traditional market than the higher income group, but the higher income group are significantly using more of it than the middle income group. Some non-economic factors not covered in the modelling process above, probably leisure shopping, product freshness or social contact, may play an important role in alluring the economically better-off people across the two countries to patronize the traditional market.

Table 5.56 has been useful in identifying variables that are more influential vis-à-vis others by considering consumer choice of all the four retail formats. Yet the variables so identified cannot be compared between different retail formats, because they are derived from the reduced model and ranked by the magnitudes of standardized coefficients. Table 5.57 fills the void by

adopting the full model and unstandardized coefficients. As such, the impact of each variable can be compared between retail formats.

Table 5.57 – Logistic regression results using the full model approach for the four retail formats

Variable	Unstandardized estimate			
	Internet	Hypermarket/ superstore	Supermarket	Traditional market
Intercept	-3.9477	0.6088	1.8717	0.1988
Gender	0.5055	-0.2122	-0.3699*	-0.7218*
Age group	-0.5811*	-0.1691*	-0.1844*	0.3835*
Occupation1	0.6971	0.3217	0.1495	-0.2386
Occupation2	0.1491	0.1632	-0.0104	-0.2223
Income1	-1.0072*	-0.7047*	-0.5106*	-0.1100
Income2	-0.6887	-0.4897*	-0.4313*	-0.3509*
Household size	0.2454	0.0735	0.0186	0.1280*
Area of residence	0.2675	0.6415*	0.4946*	0.1988
Country of residence	1.7997*	-0.2791	0.1304	-2.8099*
Number of observations	1,531			
Initial –2LL	271.564	2120.714	1827.432	1985.130
Final –2LL	245.758	2032.748	1777.103	1512.870
Model	25.806 (p=0.0022)			
Goodness of fit	5.7416 (p=0.6762)			
c statistic	0.766			
Max-rescaled RSquare	0.1028	0.0745	0.0464	0.3653

* significant at 95% confidence level
any cell with gray shade signifies the retail format that is most influenced vis-à-vis other retail formats by the independent variable in question

Age group has been singled out as important in consumer shopping behaviour in general across Britain and Taiwan (Table 5.56). Table 5.57 complements this finding by identifying shopping over the Internet, compared to shopping in other three retail formats, as being affected the most by the age group variable. As such, people of younger age are more enthusiastic toward online buying than older people.

Income has also been found to be an important static pan-country variable. Table 5.57 gives a further highlight to this finding by noting the Internet again as number one in terms of the income impact. Specifically, Internet

shoppers are most likely to come mainly from the top one-third income group.

Although 'area of residence', compared to other independent variables, is ranked only third in its influence on consumer choice of the hypermarket/superstore (Table 5.56), such an influence is the greatest when compared to the influences of the same 'area of residence' variable on other retail formats. Across Britain and Taiwan, people living in the capital city are more inclined to use the hypermarket/superstore than those living elsewhere.

Similar to the case of the 'area of residence' variable mentioned just before, although 'gender' is ranked third in effecting consumer choice of the traditional market (Table 5.56), the effect is the greatest compared to the effects of the same variable on other retail formats. Females are more likely than their male counterparts to patronize the traditional market.

The country factor is significant in affecting Internet shopping as well as traditional market shopping. This finding is exactly the same as discovered in the reduced model (Table 5.52 and Table 5.55). Yet the full model as in Table 5.57 provides a supplementary insight by highlighting that the traditional market, compared to the Internet and obviously any other retail formats being considered, is affected most by the country factor.

The two remaining variables – occupation and household size – are not discussed because their impacts on respective retail formats (grayly shaded in Table 5.57) are not significant at 95% confidence level.

Considering the degree of match of results between using the reduced model and using the full model, sixteen of the eighteen significant variables found across the four reduced models matched those of the four full models, leaving only two variables that are significant if using the reduced model but not significant if using the full model. Even so the results particularly for these two variables are not very different between the two approaches. Specifically, the 'occupation1' variable in the reduced model for the Internet is only marginally significant at p=0.0515, while the 'household size' variable in the reduced model for the hypermarket/superstore, albeit significant, is significantly lower than other significant variables in terms of the magnitude of the standardized coefficient. The high degree of match of results between the two approaches increases the confidence in using the full model, which can be criticized on the grounds of statistical parsimony, specifically for the comparison between retail formats.

5.4.3.2 Dynamic pan-country analysis

The static pan-country analysis in the preceding sub-section covers four different types of retail formats. Among these retail format types, the Internet is the newest phenomenon, and the market for Internet shopping is the least crystallized. Therefore, some sort of validity assessment may be required for the Internet-related results than results of other more established retail formats.

The preceding sub-section has found a significant impact of the country factor on Internet shopping. This result runs contrary to the common belief that the Internet is such an internationalised product that the influence of the country factor should be a minor one. As the data used for the static pan-country analysis in the previous sub-section were collected in 1998, the year

in which Internet shopping was at an early adoption stage (NetValue 2000), the corresponding result may be different after some years because the market of a product at an early adoption stage is changing at a more violent pace than that at say a mature stage. In fact, it should not be too controversial to posit that the development and probably the market structure of Internet shopping have changed a lot during the last three years. Therefore, there is every reason to conjecture that the significance of the country factor found in the preceding sub-section is attributable to the particular developmental stage at which Internet shopping was located. In the early adoption stage, the internationalisation potential of Internet shopping may not be more fully exploited.

Against these considerations, a dynamic pan-country analysis of Internet shopping, which attempts to particularly overseeing the changing influence of the country factor over years, is deemed beneficial for ascertaining the validity of results done for the Internet part. Such an additional analysis specifically for the Internet is also worthwhile in a topical sense, because 'the Web may be a fundamental paradigm shift in retail format ... the limitless opportunities of the Web make it one of the most important issues in retailing today' (Graham 1996).

Results of the analysis show that the country factor is still a significant one in influencing consumer choice of Internet shopping across Britain and Taiwan in the year 2000 (Table 5.58), as it is two years ago when the data for the static pan-country analysis in the preceding sub-section were collected. Such an influence, represented by the magnitude of the standardized estimate, is greater than any of the two demographic variables – gender and age – included in the analysis. So two years on, there has been no sign that the

strong influence of the national culture dimension on online purchase has been fading away.

Table 5.58 – Logistic regression results using forward selection of Internet shopping in 2000

Variable	Parameter estimate	Pr > chi-square	Standardized estimate
Intercept	-3.6829	0.0001	.
Gender	0.4514	0.0181	0.1238
Age	-0.2496	0.0002	-0.2034
Country	1.3765	0.0001	0.3562
Number of observations			
Initial –2LL			
Final –2LL			
Model			
Goodness of fit			
Max-rescaled RSquare			

The strong tie between the country factor and Internet shopping found in Table 5.58 is a general but key one in the sense that it encompasses every product category that can be transacted over the Internet. Alternatively, it is beneficial to enrich this study by considering one product category at a time, so as to look whether the strength of the tie between the country factor and Internet shopping varies between products. The previous 'Inter-country analysis' section shows that statistically valid significant differences of Internet shopping between Britain and Taiwan at a macro-based level are found for two product categories only – music and book. This sub-section goes in greater depth by analysing whether significant differences still exist for each of these two product categories at a micro-based level by considering other within-country variables altogether.

Results indicate that the country factor continues to be significant in influencing the decision to buy either music products or books online. What's more, this factor is the most influential vis-à-vis other within-country

factors contained in the regression modelling process for each of the two product categories (Table 5.59 and Table 5.60). So the influence of the national culture dimension is evident in not only Internet shopping at large, but also online purchase of these two popular product types.

Table 5.59 – Logistic regression results using forward selection of online music shopping in 2000

Variable	Parameter estimate	Pr > chi-square	Standardized estimate
Intercept	-6.8763	0.0001	.
Gender			
Age			
Country	2.2847	0.0259	0.5912
Number of observations	2963		
Initial –2LL	249.727		
Final –2LL	239.619		
Model	10.108 (0.0015)		
Goodness of fit			
Max-rescaled RSquare			

Table 5.60 – Logistic regression results using forward selection of online book shopping in 2000

Variable	Parameter estimate	Pr > chi-square	Standardized estimate
Intercept	-4.6217	0.0001	.
Gender			
Age	0.2206	0.0390	-0.1798
Country	1.4410	0.0026	0.3729
Number of observations	2963		
Initial –2LL	457.803		
Final –2LL	446.724		
Model	11.079 (0.0009)		
Goodness of fit			
Max-rescaled RSquare			

The strong influence of the national culture dimension in Internet shopping across different year periods and across different product categories has been validated. A question arising from these results is whether the national culture dimension continues to be strongly influential in general Internet

usage that encompasses not only shopping but also any other online activities such as communication, information search and entertainment. Answering such a query may provide interesting insights into how far the influence of the country factor goes and why such an influence exists.

Results as in Table 5.61 show that the country factor is no longer significant if the dependent variable changes from Internet shopping choice to Internet usage choice. What's more, this factor is the only insignificant one in the regression model. As a result, cross-national consumer segments can be formed in the Internet usage market, rather than the Internet shopping market, for Britain and Taiwan.

Table 5.61 – Logistic regression results using forward selection of Internet usage in 2000

Variable	Parameter estimate	Pr > chi-square	Standardized estimate
Intercept	0.6464	0.0001	.
Gender	0.4470	0.0001	0.1226
Age	-0.5097	0.0001	-0.4154
Country			
Number of observations	2963		
Initial –2LL			
Final –2LL			
Model			
Goodness of fit			
Max-rescaled RSquare			

The marked contrast of results between Internet shopping and Internet usage provides some illuminating signal about the underlying context of the country factor that inhibits Internet shopping from transcending national boundaries. The insignificance of the country factor in the Internet usage market clearly indicates that the stage of diffusion of Internet technology or Internet usage is not a major reason for the significance of the country factor in the Internet shopping market. As Taiwan has achieved a higher Internet

usage rate than an economically more developed country – Britain, so the stage of economic development should also not be a major reason for the 'significant country factor' result.

5.5 Diagnosis of model performance

Altogether twenty logistic regression models targeting at retail formats have been developed. The degree of performance of these models is subject to two questions. First, how well a particular model classifies the observed data? Secondly, how likely the sample results are given the parameter estimates? Three measurements – stemming from the concordance-discordance test, the classification test, and c statistic – will be adopted to address the first question. Two other measurements – derived from the likelihood test and Hosmer-Lemeshow Goodness-of-fit test – will be employed to hit the second question.

As noted in the earlier part of this Chapter, the twenty logistic regression models fall into three categories of analysis – intra-country, static pan-country, and dynamic pan-country, among which only the static pan-country analysis uses both reduced models and full models, while the other two categories of analysis use only reduced models. As full models, by incorporating all the hypothetical variables, are bound to be less robust, only reduced models are diagnosed for model performance. This results in sixteen logistic regression models to be examined.

In the case of consumption trend part of the study, six Poisson regression models have been constructed. As different modelling techniques use different measurements to judge model performance, and the five measurements noted above for logistic regression modelling are not

available in Poisson regression modelling, so the performance of these Poisson regression models can only be, albeit partially, judged in terms of the scaled parameter.

5.5.1 Concordance-discordance test

This test results in the percentage of concordance, discordance and tie for a particular logistic regression model. The three percentages are calculated by first taking all possible pairs of respondents for the model in which the outcomes are not the same. For instance, in the Internet model for Britain of intra-country analysis (Table 5.62), there are 3,762 pairs where one unit of the pair used the Internet for shopping in the last month and the other did not. The next step is to compute the probability of each unit of the pair that used the Internet for shopping. If the unit with the higher computed probability is the one that actually went for Internet shopping, this pair is regarded as concordant. When a pair is in the wrong order, it is treated as discordant. If both units of the pair have the same probability in choosing the Internet for shopping purpose, the pair is labelled as tied. Indubitably, a model with a high concordant percentage and a low discordant percentage is better than another model that has a lower concordant percentage and higher discordant percentage.

Table 5.62 – Concordance-discordance test

Model	Number of pairs	% Concordant	% Discordant	% Tied
Intra-country analysis				
Britain				
Internet	3,762	60.7	17.3	22.0
Hypermarket/superstore	30,160	32.8	16.3	50.9
Supermarket	24,832	10.2	0.0	89.8
Traditional market	21,450	31.7	14.5	53.8
Taiwan				
Internet	18,592	60.5	24.2	15.3
Hypermarket/superstore	345,912	60.0	34.3	5.7
Supermarket	283,920	61.7	34.7	3.7
Traditional market	240,645	73.2	24.9	1.9
Static pan-country analysis				
Internet	40,608	65.2	21.9	12.8
Hypermarket/superstore	585,104	62.8	35.9	1.3
Supermarket	476,760	59.8	37.4	2.7
Traditional market	534,234	81.9	17.3	0.7
Dynamic pan-country analysis				
Internet shopping	332,982	65.4	28.3	6.3
Online music shopping	61,782	31.4	3.2	65.4
Online book shopping	128,436	60.2	26.7	13.1
Internet usage	1,889,586	65.1	26.1	8.8

Table 5.62 shows that twelve of the sixteen logistic regression models achieved 60% or above concordance and therefore perform reasonably well in the test. The least successful results accrue mainly to the Britain part of intra-country analysis, whose interpretations therefore have to be cautioned.

5.5.2 Classification test

A classification test provides four statistics – sensitivity, specificity, false positive rate, and false negative rate – for a logistic regression model at a specified probability level. Any predicted probability higher than the specified probability level is considered a 'positive diagnosis', i.e. positive response in the model. Take Internet shopping as the response object, sensitivity refers to the proportion of respondents who have chosen the

Internet for shopping and who are also predicted to choose it because their predicted probabilities exceed the specified probability level. Specificity highlights the proportion of respondents who haven't chosen Internet shopping and who are also predicted not to choose it because their predicted probabilities are below the specified probability level. It is desirable to attain high values in both sensitivity and specificity. By contrast, it is undesirable to get high values in false positive rate or false negative rate. The former refers to those respondents who haven't chosen Internet shopping but are wrongly predicted to choose it. The latter represents the proportion of respondents who have chosen Internet shopping but are erroneously predicted not to choose it.

Clearly, any one of the above four statistics alone tells only part of the story. For instance, if one lowers the cut-off point of positive diagnosis, namely the specified probability level, sensitivity increases but the false positive rate also increases. If one raises the cut-off point, specificity increases, but so does the false negative rate.

Table 5.63 - Classification test at a cut-off point of positive diagnosis equivalent to 0.5

unit: %

Model	Sensitivity	Specificity	False positive	False negative	Overall correct
Intra-country analysis					
Britain					
Internet	0.0	100.0	.	3.1	96.9
Hypermarket/superstore	0.0	100.0	.	41.1	58.9
Supermarket	100.0	0.0	27.5	.	72.5
Traditional market	0.0	100.0	.	22.1	77.9
Taiwan					
Internet	0.0	100.0	.	1.4	98.6
Hypermarket/superstore	58.0	60.6	38.8	42.7	59.2
Supermarket	98.0	4.1	28.2	54.8	71.1
Traditional market	96.7	15.2	20.1	42.9	78.5
Static pan-country analysis					
Internet	0.0	100.0	.	1.8	98.2
Hypermarket/superstore	53.7	64.0	40.8	41.3	59.0
Supermarket	100.0	0.0	28.4	.	71.6
Traditional market	91.7	53.2	21.7	22.3	78.2
Dynamic pan-country analysis					
Internet shopping	0.0	100.0	.	3.9	96.1
Online music shopping	0.0	100.0	.	0.7	99.3
Online book shopping	0.0	100.0	.	1.5	98.5
Internet usage	32.4	87.0	46.7	26.2	69.9

. This occurs in some boxes because the denominator is zero.

At the SPSS default cut-off point of 0.5, all the sixteen models achieve an overall correct rate of at least nearly 60%, among which most attain more than 70%, and some are as high as more than 90% (Table 5.63). This indicates that most of the respondents in each model have been correctly classified.

If instead of using the SPSS default cut-off point of 0.5, an approximated unbiased jackknifing method and a strict cut-off point equivalent to the observed sample proportion of events is adopted, the classification results change quite substantially (Table 5.64) with lower overall correct rates nearly across the board. Nevertheless, still thirteen of the sixteen models achieve an overall correct rate beyond 50%, with seven of them getting at least nearly

60%. The worst performing models are 'Taiwan Internet', 'online music shopping', and 'online book shopping' models.

Table 5.64 – Classification test at a cut-off point of positive diagnosis equivalent to the observed sample proportion of events

unit: %

Model	Sensitivity	Specificity	False positive	False negative	Overall correct
Intra-country analysis					
Britain					
Internet	72.7	51.8	85.4	1.7	52.4
Hypermarket/superstore	62.8	53.8	51.3	32.5	57.5
Supermarket	57.4	44.3	26.9	71.7	53.8
Traditional market	48.7	56.4	75.9	20.5	54.7
Taiwan					
Internet	68.8	46.4	98.3	0.9	46.7
Hypermarket/superstore	55.3	64.1	37.7	42.8	59.6
Supermarket	55.7	58.9	22.9	65.1	56.6
Traditional market	65.0	65.8	13.1	64.9	65.2
Static pan-country analysis					
Internet	63.0	61.2	97.2	1.1	61.2
Hypermarket/superstore	62.5	56.1	42.0	39.4	59.2
Supermarket	62.7	49.7	24.2	65.4	59.0
Traditional market	88.7	58.4	20.3	26.3	78.1
Dynamic pan-country analysis					
Internet shopping	75.2	56.5	93.4	1.8	57.2
Online music shopping	90.5	37.8	99.0	0.2	38.2
Online book shopping	95.2	32.9	99.0	0.1	33.4
Internet usage	65.7	59.7	57.3	20.8	61.6

In considering a baseline measure against which the classification results in Table 5.63 and Table 5.64 can be further assessed, this study uses the proportional chance criterion. This criterion acknowledges unequal prior probabilities caused by unequal group sizes, and therefore takes into account the actual group size of the observed frequencies. The proportional chance criterion is derived as $\alpha^2+(1-\alpha)^2$, where α is the proportion of cases observed in group 1 and $1-\alpha$ is the proportion of cases observed in group 2.

Results show that all the sixteen models at a 0.5 cut-off point outperform their respective proportional chance criteria, but only six models can do so

on the basis of a cut-off point equivalent to the observed sample proportion of events (Table 5.65). This is understandable because six of the sixteen models get a very high level of the proportional chance criterion and are therefore very difficult to be beaten against.

Table 5.65 – Proportional chance criterion

unit: %

Model	Alpha	Proportional chance criterion
Intra-country analysis		
Britain		
Internet	1.8	96.5
Hypermarket/superstore	40.3	51.9
Supermarket	69.8	57.8
Traditional market	20.2	67.8
Taiwan		
Internet	0.8	98.4
Hypermarket/superstore	51.7	50.1
Supermarket	71.2	59.0
Traditional market	77.6	65.2
Static pan-country analysis		
Internet	1.5	97.0
Hypermarket/superstore	47.8	50.1
Supermarket	70.7	58.6
Traditional market	58.0	51.3
Dynamic pan-country analysis		
Internet shopping	3.6	93.1
Online music shopping	0.6	98.8
Online book shopping	1.4	97.2
Internet usage	28.9	58.9

5.5.3 c statistic

The c-statistic quantifies the area under a receiver operating characteristic curve (Bamber 1975; Hanley and McNeil 1982). A higher c-statistic indicates a greater classificatory power of the model involved. Table 5.66 shows that most of the models achieve a c statistic beyond a threshold level of 0.6. Again the Britain part of intra-country analysis is less well performed with a c statistic of less than 0.6 attached to three of the four models.

Table 5.66 – c statistic

Model	c statistic
Intra-country analysis	
Britain	
Internet	0.717
Hypermarket/superstore	0.583
Supermarket	0.551
Traditional market	0.586
Taiwan	
Internet	0.682
Hypermarket/superstore	0.629
Supermarket	0.635
Traditional market	0.741
Static pan-country analysis	
Internet	0.717
Hypermarket/superstore	0.634
Supermarket	0.612
Traditional market	0.823
Dynamic pan-country analysis	
Internet shopping	0.686
Online music shopping	0.641
Online book shopping	0.667
Internet usage	0.695

5.5.4 Likelihood test

The key statistic associated with the test is –2 log likelihood. It is actually derived from the likelihood value, which shows the probability of the observed results given the parameter estimates. Since this value must be less than 1, it is a statistical practice to use –2 times the log of the value, so called -2 log likelihood, to measure how well the estimated model fits the data. A good model has a high likelihood value that converts into a low –2 log likelihood value. This likelihood value is compared between equations, with the difference showing the change in predictive fit. A Chi-square test is employed to examine whether the change is significant.

Table 5.67 presents the likelihood test results of the sixteen logistic regression models. In the Table, the second column displays the –2 log likelihood value if the model has only the intercept, while the third column shows the value if covariates for the model are incorporated. Obviously, incorporating these covariates improves the model fit, thereby reducing the –2 log likelihood. The fourth column calculates the difference in values between the previous two columns, which is the magnitude of improvement in the model and has a chi-square distribution if the model fits. A significantly large magnitude of improvement will lead to a very low probability value. Under the customary rule of 95% confidence level, all the sixteen models fit well with the data.

Table 5.67 – Likelihood test

Model	-2 log likelihood Intercept only	-2 log likelihood Intercept and covariates	Chi-square	p-value
Intra-country analysis				
Britain				
Internet	97.962	90.735	7.227	0.0072
Hypermarket/superstore	478.058	468.221	9.837	0.0017
Supermarket	415.102	397.624	17.478	0.0001
Traditional market	372.856	364.511	8.345	0.0039
Taiwan				
Internet	169.349	161.264	8.085	0.0176
Hypermarket/superstore	1630.240	1566.823	63.417	0.0001
Supermarket	1412.133	1356.262	55.870	0.0001
Traditional market	1251.043	1096.110	154.933	0.0001
Static pan-country analysis				
Internet	271.564	252.720	18.844	0.0003
Hypermarket/superstore	2120.714	2039.152	81.562	0.0001
Supermarket	1827.432	1778.519	48.913	0.0001
Traditional market	1985.130	1516.752	468.378	0.0001
Dynamic pan-country analysis				
Internet shopping	985.555	940.002	45.553	0.0001
Online music shopping	249.727	239.619	10.108	0.0015
Online book shopping	457.803	446.724	11.079	0.0009
Internet usage	3685.372	3353.290	332.082	0.0001

5.5.5 Hosmer-Lemeshow Goodness-of-fit test

The test essentially compares the observed probabilities to those predicted by the model, and its resulting statistic is defined as $Z^2=\Sigma\ [(Residual_i^2) / (P_i*(1-P_i))]$

where the residual is the difference between the observed value and the predicted value, P_i. Contrary to the likelihood test in which the researcher aims at a substantial improvement in –2 log likelihood and its concomitant low probability value, Hosmer-Lemeshow Goodness-of-fit test hopes for a high probability value, which leads to no rejection of the null hypothesis that the model fits the data. At 95% confidence level, most of the models are satisfactory (Table 5.68). Exceptions are the static pan-country traditional market model and two other dynamic pan-country models, which turn out Goodness-of-fit probability values of less than 0.05.

Table 5.68 – Hosmer-Lemeshow Goodness-of-fit test

Model	Goodness-of-fit statistic	p-value
Intra-country analysis		
Britain		
Internet	1.0011	0.8010
Hypermarket/superstore	0.0000	.
Supermarket	0.0026	.
Traditional market	0.0000	.
Taiwan		
Internet	5.9009	0.6583
Hypermarket/superstore	10.4860	0.2326
Supermarket	13.7490	0.0886
Traditional market	9.5676	0.2967
Static pan-country analysis		
Internet	5.7702	0.5668
Hypermarket/superstore	8.1762	0.4164
Supermarket	9.3242	0.3157
Traditional market	37.8410	0.0001
Dynamic pan-country analysis		
Internet shopping	17.7420	0.0233
Online music shopping	47E-24	.
Online book shopping	13.8060	0.0548
Internet usage	24.1880	0.0011

5.5.6 Scale parameter

One of the most prominent problems in Poisson regression modeling is over-dispersion, which arises from the absence of a random disturbance term that

can take account of unexplained variation. The problem is found in the three convenience trend models of this study (Table 5.69), as exemplified by the large scaled deviation relative to the degrees of freedom. For example, in the Britain total sample, the scaled deviation is more than one-and-a-half of the degrees of freedom.

Although over-dispersion does not affect the regression coefficients, it can significantly overestimate test statistics and underestimate standard errors, which may lead to incorrect conclusions. To tackle this problem, the scale parameter, which has a value of 1 by default, is adjusted to be the square root of the ratio of the Pearson's chi-square to its degrees of freedom. As a result, the ratio of the scaled deviance to its degrees of freedom decreases from a range between 1.4525 and 1.5539 to a range between 1.1053 and 1.1342 for the three convenience trend models (Table 5.69), and thus the problem of over-dispersion is largely solved.

Table 5.69 – Adjustment for over-dispersion

		Convenience trend			Health trend		
		Britain total sample	Britain single-adult household sample	Taiwan total sample	Britain total sample	Britain single-adult household sample	Taiwan total sample
	Degrees of freedom	5,043	1,372	1,169	5,043	1,372	1,169
Before adjustment	Scaled deviation	7797.5592	1,992.8574	1,816.5308	5,564.3888	1,600.6242	1,363.9309
	Scale parameter	1	1	1	1	1	1
	Scaled deviance/ degree of freedom	1.5462	1.4525	1.5539	1.1034	1.1666	1.1668
After adjustment	Scaled deviation	5,719.7226	1,550.5661	1,292.1520	5,958.6729	1,601.8027	1,278.3704
	Scale parameter	1.1676	1.1337	1.1857	0.9663	0.9996	1.0329
	Scaled deviance/ degree of freedom	1.1342	1.1302	1.1053	1.1816	1.1675	1.0936

5.6 Chapter summary

Before any analysis is taken, corresponding variables and data have to be checked so as to ascertain that they are eventually set up in a correct fashion ready to be analyzed. Accordingly, this study examined the coding of the six demographic variables wholly or partly occurring in all the Surveys used. Inevitably, these demographic variables have been coded differently between Surveys. For the purpose of cross-national consumer segmentation that necessitates a combination of data from different Surveys, these variables are recoded as appropriate.

Considering the statistical techniques – logistic regression and Poisson regression – used in this study, two possible data problems are identified and require close scrutiny. These are multicollinearity and non-convergence.

The former will make the estimations of the partial regression coefficient less precise, while the latter will undermine the validity of the fit of the regression model so derived. Results show that multicollinearity does not exist in this study, but non-convergence is embedded with the dummy-form age variable in the Internet regression model. To rectify the problem, the age variable has to be expressed in a different way, i.e. from a dummy-form variable to a quantitative variable.

Having checked and solved the problem associated with the variables and data used in this study, four sets of hypothetical regression models can be drawn up. The first set is concerned with intra-country retail choice modeling. The second set covers static pan-country models of the choice of the Internet, the hypermarket/superstore, the supermarket, and the traditional market respectively across Britain and Taiwan based on the same year of 1998. The third set refers to dynamic pan-country regression modeling specifically on the Internet for the two years of 1998 and 2000. The last set contains participation decision regression models of the convenience and health trends, by analyzing British total sample, British single adult household sample and Taiwanese sample respectively. Testing of these hypothetical regression models and their concomitant results are incorporated into the findings, which also include results arising from analyses of non-regression types.

The findings are structured according to the three stages of cross-national consumer segmentation analysis, i.e. intra-country analysis, inter-country analysis, and pan-country analysis.

Intra-country analysis entails the use of means, frequency analysis and chi-square analysis to find the usage rate of each object by levels of a particular demographic variable, and determine whether there is any significant difference between each of the six objects being studied – Internet, hypermarket/superstore, supermarket, traditional market, convenience trend, and health trend – and each of the six demographic variables adopted. The analysis also involves the use of pairwise comparison test to identify any significant difference between every possible pair of levels of a particular demographic variable that has more than two levels. In addition, logistic regression and Poisson regression techniques are employed to examine further the impact of the six demographic variables, considered altogether rather than in isolation as in the case of ANOVA, on each of the six objects being studied. Finally, Spearman correction analysis is conducted on testing the relationship between convenience and health trends in Britain and Taiwan respectively. Results of all the above-mentioned analyses are rich yet too broad to be summarized in this section, but have been presented at appropriate places in the main text of this Chapter.

Inter-country analysis is conducted to identify any macro-based difference of each of the four retail formats between Britain and Taiwan. This sort of analysis is not conducted on the two consumption trends, because their corresponding datasets are not comparable. By using contingency tests, results suggest that the difference in usage rates for the Internet and the supermarket respectively is not significant, but for the hypermarket/superstore and the traditional market respectively is significant between the two countries. Additional inter-country analysis is carried out on the Internet for each of the eighteen product types being considered.

Results show that only two product types – music/CDs and books – are statistically and accurately different between the two countries.

Three technical questions need to be clarified before pan-country analysis begins. The first question is concerned with the choice between the forward stepwise selection approach – reduced model - and the approach that keeps all the hypothetical variables in the final model – full model. This study uses both so as to exploit the advantages of each approach. The second question is whether interaction terms, i.e. terms that combine two of the demographic variables, should be used in the analysis. Results of a preliminary run of four static pan-country regression models each including 34 additional interaction terms suggest that it is apparently not worthwhile to include interaction terms in the analysis. The third question is about whether standardized or unstandardized regression coefficients should be used in interpreting model results. This study uses both of them in appropriate places. As such, the former are used when the influences of different variables are compared to each other within the regression model, while the latter are adopted when the impacts of the same variable are compared to each other between different regression models.

The actual work of pan-country analysis covers two phases. Static pan-country analysis starts by using the reduced model approach and standardized coefficients to identify and compare between variables that has significantly affected consumer choice of each retail format across Britain and Taiwan on the same year basis of 1998. Results show that the country variable is non-significant in the hypermarket/superstore and the supermarket models, which contributes to the feasibility to form cross-national consumer segments for each of the two retail formats. By contrast,

the country variable is significant in the Internet and the traditional market models, which deter the formation of cross-national consumer segments.

Static pan-country analysis then proceeds to involve the use of the full model approach and unstandardized coefficients for comparing the impacts of the same independent variable on consumer choice between retail formats. Results show that shopping over the Internet, compared to shopping in the other three retail formats, is most affected by the age group variable as well as the income variable. On the other hand, the hypermarket/superstore is most conducive to the 'area of residence' variable, while the traditional market is most susceptive to the gender variable as well as the country variable.

The second phase of pan-country analysis – dynamic pan-country analysis – focuses on the Internet and attempts first to monitor possible changes in the impact of the country factor on Internet shopping in general across years. Results show that the country factor still exerts a significant impact in the year 2000, which is two years after the Survey data for static pan-country analysis were collected. Additional dynamic pan-country analyses suggest that the country factor is significant not only for online shopping in general, but also online music shopping and online book shopping in particular.

However, further dynamic pan-country analysis highlights a marked contrast of results between Internet shopping and Internet usage, because the country factor is no longer significant if the dependent variable changes from consumer choice of Internet shopping to that of Internet usage.

All the regression models developed in this study are scrutinized using a variety of measures for assessing their degrees of performance. As such, five measures – the concordance-discordance test, the classification test, c statistic, the likelihood test, and Hosmer-Lemeshow Goodness-of-fit test, are employed to examine the logistic regression models, while the scale parameter is adopted in the case of the Poisson regression models. Results show that most of the models perform reasonably well. There are some exceptions though, which are mainly in some intra-country British models as well as dynamic pan-country online music and book shopping models. Caution has to be exercised in applying these models in practice.

Chapter 6 – Conclusions and future research directions

The preceding Chapter started with the technical aspects of the analysis, including coding of variables, data problems, and hypothetical regression models. It then proceeded to the findings presented in a technical way.

This Chapter uses the findings of the previous Chapter to draw up conclusions in a non-technical, substantive way, which fall into two categories. The first is concerned with evaluating whether each research objective stated in Chapter 1 has been met. The second is about discussions of some key issues that exert great impacts on the overall composition, validity and usefulness of the findings.

The Chapter ends with a discussion of future research directions of the study.

6.1 Conclusions

6.1.1 Evaluation against research objectives

Nine research objectives have been put forward in Chapter 1, which will be separately discussed under the following sub-headings from 6.1.1.1 to 6.1.1.9. The first three are of substantive nature, while the latter six are more conceptual in substance.

6.1.1.1 Empirical and nationally representative cross-national consumer segmentation research

One of the three major research objectives of this study is to conduct empirical cross-national consumer segmentation research that is nationally representative. As elaborated in Chapter 4, this study used four nationally

representative datasets across Britain and Taiwan, which have been checked for equivalence required for cross-national research. Corresponding analyses undertaken were covered in Chapter 5, and the most relevant result arising from the research objective is the identification of cross-national consumer segments of different retail formats summarized in Table 6.1 that is adapted from findings presented in the preceding chapter.

As shown, although cross-national consumer segments, represented by a number of demographic variables, for the Internet and the traditional market are found, they are more real in words than in substance because of the significance of the dimension of national culture that signifies the impracticability of the formation of pan-country consumer segments for each of these two retail formats as of 1998.

In contrast, cross-national consumer segments of the hypermarket/superstore and the supermarket are freed from the country factor. Additionally, Table 6.1 shows that, by breaking the national boundary, cross-national consumer segments of these two retail formats are very similar. They are younger, financially better off, and living in the capital city. The only demographic characteristic that exists among supermarket shoppers but not hypermarket/superstore shoppers is gender. The females are more likely than the males to patronize the supermarket. This may be attributable to the notion that going to hypermarkets/superstores often requires driving a car and taking bulky goods back home, which are arguably male tasks. On the other hand, hypermarket/superstore shoppers, rather than supermarket shoppers, are characterized by large household size.

Table 6.1 – Cross-national consumer segments* of different retail formats

	Internet	Hypermarket/ Superstore	Supermarket	Traditional market
Gender			Female	Female
Age	Younger	Younger	Younger	Older
Occupation	Employer/ manager/ professional			
Income		Top one-third income status	Top one-third income status	Top and bottom one-third income status
Household size		Large		Large
Region of residence		Capital city	Capital city	
Country of residence	Britain			Taiwan

*based on survey data collected in 1998

Analysis of Internet shopping across Britain and Taiwan was, as noted in Table 6.1, conducted for the year of 1998, which shows the most unexpected result, compared to those of the other three retail formats, that 'country' is a significant determinant of whether a respondent pursues online purchase. However, the context of the country factor is very complicated, and so the result could be questioned as probably 'contaminated' by the Internet development stage factor. In other words, the country difference might be largely due to the fact that, in the survey year of 1998, the Internet was still at an early adoption stage, therefore the internationalization capability and potential of the Internet's shopping facilities was not yet realized.

As Internet development has been impressive in all fronts from 1998 onwards, so a similar analysis was conducted for the year of 2000. The country factor was again found to be more important than many other intra-country variables in deciding whether a respondent conducted online purchase. This result greatly clears up the suspicion that the significance of the country factor found in Table 6.1 might be unreliable and even spurious.

The result is further substantiated by evaluating Internet usage across Britain and Taiwan in the same year, which points to the insignificance of the country factor. So there is a sharp contrast of importance of the country factor between Internet shopping and Internet usage: significant in the former but not significant in the latter.

A comparison of Internet usage and shopping figures between Britain and Taiwan shows that the percentage of Internet users in Taiwan is higher than that in Britain. Yet when it comes down to Internet shoppers, the percentage in Taiwan is much lower than that in Britain. So there are very probably some factors, other than general economic factors or innovation diffusion factor, which explain the divergence of the intensity of Internet shopping between Britain and Taiwan.

6.1.1.2 Global technology versus national culture in retail formats

The Internet, the hypermarket/superstore, and the supermarket have been noted in numerous studies (see Chapter 3) as embracing global retail technologies that possess the capability and potential to transcend across national cultures from a macro-based perspective. This notion has been validated particularly for Britain and Taiwan in Chapter 5. As such, no macro-based country difference was found regarding the use of the Internet and the supermarket. Although the difference has been found in the case of the hypermarket/superstore, the successful transfer of hypermarket/superstore technologies to Taiwan based on a macro-based perspective cannot be denied. This is because between Britain and Taiwan, the latter is the recipient culture that absorbs hypermarket/superstore technologies from overseas, including British retailers such as Tesco. As of 1998, the usage rate of the hypermarket/superstore in Taiwan was 51.7%,

which was higher than that in Britain, at 40.3%. So the difference only shows that the inward internationalization of the hypermarket/superstore is so popular that its usage rate even surpasses that of Britain.

Contrary to an abundance of studies that provided the macro-based evidence or notion about the permeation of Internet, hypermarket/superstore, and supermarket technologies into different cultures, there has not been any research that considered the same issue from a micro-based perspective. This is surprising because individual consumers, in aggregate, hold the key to deciding whether a retail format has permeated the national culture in which they live. In deciding on the use of the retail format, each individual consumer is influenced by a multitude of personal factors, including demographic factors. In order to fill the void of micro-based research on 'global technology versus national culture in retail formats', this study tests whether global retail technologies can transcend national cultures from a micro-based perspective for Britain and Taiwan. Before this micro-based test is taken, a corresponding macro-based test has found that the usage rate of the more retailing-advanced country, Britain, is not significantly higher than that of the retailing-less-advanced country, Taiwan, for each of the three abovementioned retail formats.

Demographic factors, one of the most fundamental personal factors influencing retail choice, are used for comparison to the country factor in evaluating the relative functioning of global technology and national culture. If the country factor is found to be non-significant while some demographic factors are significant, then the notion that global retail technology can transcend national cultures holds true not only from a macro-level perspective, but also from a micro-based perspective. This shows that, for

Britain and Taiwan, the permeation of the global retail technology in question is so deep that people make the retail choice on the basis of personal factors only, irrespective of which culture they belong to. On the other hand, if the country factor is found to be more significant than most or all of the demographic factors, then the notion that global retail technology transcends national cultures is rejected from a micro-based perspective. As such, the culture that one belongs to exercises greater influence than his/her personal background, represented by a set of demographic factors, on the use of the retail format in question.

Respective logistic regression results in Chapter 5 have shown that the country factor is significant in the use of the Internet and the traditional market, and non-significant in the use of the hypermarket/superstore and the supermarket. These suggest that hypermarket/superstore and supermarket technologies have successfully transcended national cultures across Britain and Taiwan to the extent that cultural groupings are not influential at all, compared to other personal background factors, in deciding on the use of the hypermarket/superstore and the supermarket. So a consensus of results is attained from both macro-based and micro-based perspectives. On the other hand, Internet technology cannot successfully transcend national cultures across Britain and Taiwan based on the finding that cultural groupings are more influential than most of the personal background factors being considered in online shopping decision making. Lastly, the strong cultural influence in the use of the traditional market supports the common belief that the traditional market is a culturally bound institution.

Table 6.2 shows max-rescaled RSquares of each of the four logistic regression models if a variable is excluded while all other variables are included. The

max-rescaled RSquare, which measures the explanatory power of the respective model, is the second lowest in the Internet model and the lowest in the traditional market model, if the country variable is excluded. By contrast, only a very small decrease in max-rescaled RSqaures is found in the hypermarket/superstore model and the supermarket model, if the same variable is excluded. This highlights the active functioning of the national culture dimension in Internet and traditional market shopping, particularly when compared to the case in hypermarket/superstore and supermarket shopping.

Table 6.2 – Max-rescaled RSquare if a variable is excluded, all other variables included

Name of variable excluded	Internet	Hypermarket/ superstore	Supermarket	Traditional market
None	0.1028	0.0745	0.0464	0.3653
Gender	0.0974	0.0719	0.0390	0.3481
Age group	0.0563	0.0614	0.0274	0.3382
Occupation	0.0977	0.0713	0.0456	0.3639
Income	0.0710	0.0353	0.0306	0.4071
Household size	0.0929	0.0716	0.0462	0.3606
Region of residence	0.1020	0.0610	0.0397	0.3646
Country of residence	0.0639	0.0718	0.0459	0.1753

The same pattern of results is found if the chi-square of –2 log likelihood, rather than the max-scaled RSqaure, is used. As shown in Table 6.3, the chi-square of –2 log likelihood, which measures the degree of fit of the respective model, is the second lowest in the Internet model and the lowest in the traditional market, if the country variable is excluded. This signifies that the national culture dimension plays a more contributory role than most of the intra-country variables in fitting the Internet model and the traditional market model.

Table 6.3 - Chi-Square of –2 Log Likelihood if a variable is excluded, all other variables included

Name of variable excluded	Internet	Hypermarket/ superstore	Supermarket	Traditional market
None	25.806	87.966	50.329	472.260
Gender	24.438	84.747	42.160	446.369
Age group	14.226	75.003	30.654	452.664
Occupation	24.503	84.096	49.452	470.345
Income	16.272	46.414	37.673	620.971
Household size	23.305	84.459	50.138	465.153
Region of residence	25.596	71.651	42.924	471.219
Country of residence	15.983	84.694	49.730	208.542

6.1.1.3 Identification of user segments of retail formats and consumption trends

This study adopts a three-stage approach to identify cross-national consumer segments, as well as to assess and compare between internationalization capability and potential of each considered segmentation target. Essentially the final stage – pan-country analysis – is a culmination of the first two stages – intra-country analysis and inter-country analysis. The last Chapter has noted that inter-country analysis is less effective than pan-country analysis in the sense than the former does not consider any other possibly influential variables in the determination of whether the country variable is significant. On the other hand, intra-country analysis stands in its own right to contribute to the practical side of cross-national consumer segmentation. When cross-national consumer segments cannot be found in the analysis, the next alternative is to identify consumer segments within each country involved so that some sort of segmentation strategy can still be implemented. In this sense, identification of user segments of each retail format and consumption trend is complementary to the mainstream work of cross-national consumer segmentation in this study.

Intra-country analysis has been conducted on each segmentation target from three perspectives. The first involves the use of ANOVA to test whether there is any overall difference of significance of each considered demographic variable in isolation in its relationship to the segmentation target being studied. The second perspective supplements the first by conducting a pairwise comparison test on every possible pair of levels of the demographic variable being studied in their relationship to the segmentation target. This perspective is important for all those variables that have more than two levels, because ANOVA as used in the first perspective cannot identify which level is significantly different from another level of any more-than-two-level variable. The third perspective considers all the considered demographic variables simultaneously in testing their relationship to the segmentation target, because considering only one demographic variable at a time without considering other variables may lead to less precise results. So basically the third perspective is to crosscheck the validity of the results arising from the first perspective.

The preceding Chapter has found that using either the first perspective or the third perspective leads to very similar results. So presenting the results arising from one of the two perspectives, rather than presenting the results from both perspectives, suffices for the sake of simplicity. This section chooses, and then organizes, the results arising from the first perspective because it is simpler to comprehend. Results from the second perspective, pairwise comparison test, are not discussed here mainly because their usefulness depends on the results from the first perspective. Overall significance of a particular variable as found from the first perspective determines whether it is worthwhile to go further to search for the significance of any pair of levels of that variable through the second

perspective, whose findings have been comprehensively presented in the last Chapter. Moreover, the pattern of results from the second perspective is scattered, while that from the first perspective provides the scope of organization that can offer greater insights.

Table 6.4 – List of demographic variables that significantly affect consumer choice of each retail format or consumption trend

	Britain	Taiwan
Internet		Income
Hypermarket/superstore	Income Region of residence	Age Income Region of residence
Supermarket	Region of residence	Gender Age Income
Traditional market	Gender	Gender Age Occupation Household size
Convenience trend	Occupation Income Household size Region of residence	Gender Age Income Region of residence
Health trend	Gender Age Income Household size Region of residence	Gender Age Income Region of residence

Household level variables – income, household size, and region of residence – are considered in total sample, and individual level variables – gender, age, occupation – are considered in single-adult household sample for Britain

Table 6.4 organizes the results arising from the first perspective – overall significance test of each variable in isolation with regard to its relationship to the segmentation target in question. It shows that demographic variables as a whole are more effective in segmenting consumer choice of retail formats in Taiwan than in Britain. Altogether eleven demographic variables are found to significantly affect consumer choice across the four retail formats in Taiwan, while only four such demographic variables are found in Britain. In

contrast, demographic variables are not significantly more effective in segmenting convenience and health trends in one country than in another. Retail development as a whole is significantly ahead in Britain than in Taiwan. For example, the first hypermarket/superstore occurred in Britain in mid 1960s, while a similar one appeared in Taiwan after more than twenty years. Kotler (2000) posited that demographic variables are relatively more effective in a less developed market than in a more developed market. On the other hand, the convenience and health consumption trends might have gathered momentum during the same decade in Britain and Taiwan, which may contribute to the relative importance of demographic factors being generally equal between Britain and Taiwan. Ritson and Hutchison (1991) found that non-economic factors, such as the pursuit of convenience and health, started to be dominant factors from early 1980s onward in Britain. In Taiwan, based on Lee's (1998) work, the growth of convenience-oriented and health-oriented food products might have begun to take shape from late 1980s.

Demographic variables exert differing levels of impact on consumer choice of not only retail formats as a whole between Britain and Taiwan, but also between retail formats in the same country. An interesting feature in Taiwan, rather than Britain, is that the more 'traditional' a retail format is, the more influential demographic characteristics are on consumer choice. Four demographic variables are found significant in the case of the traditional market, three in the case of both the hypermarket/superstore and the supermarket, and only one in the case of the Internet. So demographic variables may be influential not only in less developed markets as suggested by Kotler (2000), but also in more traditional products, such as the traditional market as opposed to the Internet, or traditional food products as opposed to

western food products. The close link between demographic variables and consumer choice of the traditional market, as found in Taiwan, is not seen in Britain. This suggests that the traditional market in Britain, though traditional in name, is less traditional in substance as felt by British consumers compared to Taiwanese consumers. People in Taiwan patronize the traditional market as part of their routine daily life inherited from what their ancestors did, which is probably not the case in Britain.

6.1.1.4 Assessment and comparison of internationalization capability/potential of products

Internationalization becomes an increasingly essential concept in today's business, while consumers are the ultimate arbitrator of whether internationalization of a particular product is successful. Therefore, the establishment of a mechanism that can draw on impartial consumer information to assess and compare the internationalization capability and potential of products will be beneficial. The mechanism should ideally consider a broader range of determinants that are considered influential in consumer decision making so that it can reflect more truly the complexity of real life. Unfortunately, no such mechanism of any type has been developed so far.

This study is a first step to building up the mechanism by borrowing from the statistical procedure originally used for cross-national consumer segmentation. The country variable is a key variable in that procedure. This variable is compared to within-country personal variables, which are demographic variables in the case of this study, so as to determine whether the country variable is significant and if so whether it is more significant than most of the other within-country personal variables being considered. Non-

significance of the country variable implies that the product in question is capable, empirically or potentially, of internationalizing across the countries being considered. Significance of the country variable suggests otherwise. On the other hand, comparisons of internationalization capability and potential between two or more products can be made by considering the degree of significance of the country variable and the ranking of the degree of significance of the country variable alongside other within-country personal variables for each product.

The mechanism as elaborated above provides an objective and systematic way for the assessment and comparison of internationalization of any product. It also produces a synergy effect in academia by forging a link between two apparently separate areas of study: internationalization on the one hand and cross-national consumer segmentation on the other.

6.1.1.5 Fuller exploitation of established national survey datasets

In the UK, a large amount of national survey datasets, such as those in the Data Archive based in the University of Essex, are readily available for academicians to exploit. Yet surprisingly, little effort has been spent on exploiting these survey datasets beyond the original work of the organization that collected the data. National Food Survey has been implemented for more than fifty years. Yet only a handful of academicians (e.g. Lund and Derry 1982; Hutchins 1993; Fine, Heasman and Wright 1998) so far attempted secondary analysis of the Survey dataset. Cases of further exploitation of survey datasets located in the commercial sector are even scarcer. For example, the two British commercial survey datasets used in this study – 'Where People Shop' Survey and 'Electronic Commerce' Survey – have not been 'reused' so far. This is surprising because fuller exploitation of

these established national survey datasets provides a high potential for originality and for the testing of theoretical constructs (Dale 1987; Dale, Arber and Procter 1988).

The potential of using these survey datasets may be even higher if these British survey datasets are used with survey datasets of other countries in a single study. It allows the researcher to have a more comprehensive viewpoint, which may lead to discovery of hidden phenomena that are impossible to be found in single country studies. This opens the way for new perspectives, and identifies gaps in knowledge of the subject being studied (Hantrais and Mangen 1996). For example, in this study, a synthetic analysis of the four established survey datasets provides a new perspective and fills the knowledge gap in the relative impact of global technology and national culture on the use of different types of retail formats.

A critical success factor of the exploitation of national survey datasets that have been collected by different institutions and in different countries for a particular study is the assurance of equivalence between respective data in these datasets. This study carried out diagnosis of sampling equivalence on sampling design and sampling unit, construct equivalence on retail formats, consumption trends and segmentation base, and measurement equivalence on retail choice and participation decision. Results of diagnosis are generally positive that allow a synthetic analysis of most of the survey datasets to go ahead.

One may perceive the exploitation of established survey datasets as an easier option for researchers than primary analysis, because the data collection phase of the research process is skipped. In fact, the former involves much

time and effort in understanding the structure of the data and the definitions used, which is not required for primary analysis (Glover 1996). Moreover, the exploitation of established survey datasets has been acknowledged as probably especially difficult in cross-national research, which has been viewed as 'the last place for the inexperienced secondary analyst to begin his career' (Hyman 1972). However, if a research design that involves an attempt at diagnosing the equivalence between datasets of different countries is thoroughly implemented, as shown in this study, the prospect of academic discovery that is impossible in any single-country study may be very great.

6.1.1.6 Transnational quantitative retail choice modeling

A few quantitative retail choice models have been developed over the past three decades. For example, Monroe and Guiltinan (1975) used the path analytic method to draw up the relationships between store choice and its determinant factors including socio-economic status, geographic location and self-perception in the US. Manrai and Manrai (1985) developed a model that links retail choice to factors such as socio-economic status also in the US. These models contribute to an increased understanding in the direction, magnitude, and possibly sequence of effect, of factors that are considered to produce significant effects on some aspect of retail choice in a particular country. However, compared to the entire set of retail choice research conducted so far, studies on quantitative retail choice modeling occupied only a tiny portion.

The pace of internationalization of the global retailing sector has been faster than ever in the last one to two decades. This is partly triggered by rapid economic growth in many parts of the world, such as South America and Asia, including Taiwan. Increasingly, marketing academicians and

practitioners in the retailing field should take such an internationalization trend into account. Quantitative studies on retail choice modeling should incorporate some sort of transnational elements. Yet surprisingly no such endeavour has been attempted so far.

This study fills the void by developing transnational quantitative choice models of four retail formats across Britain and Taiwan. Modeling of one of the four retail formats – the Internet – has been carried out twice more using a different set of demographic variables and a different time period. So altogether six transnational quantitative retail choice models have been developed in this study. These models depict the direction and magnitude of the impact of a set of significant demographic variables on the retail format being studied across Britain and Taiwan. This contributes not only to the identification of transnational consumer segments, but also to the assessment and comparison of the internationalization capability and potential of the retail format in question relative to that of other retail formats. Such results, which are not possible to be derived through single-country retail choice modeling, provide a greater understanding in retailing of an international context.

6.1.1.7 New approach and scope of retail internationalization

Presumably all the retail internationalization studies so far have adopted either a macro-based country level or an enterprise case study approach, both of which have provided valuable insights into different aspects of retail internationalization, such as its process or motivating factors. However, the knowledge base of retail internationalization may be further enriched through viewing from a micro-based individual level approach, because individual consumers, in aggregate, play a decisive role in the direction and

success of retail internationalization. So far no major research that adopts such an approach has been conducted.

Besides, in terms of the geographical scope, previous retail internationalization studies have been largely concentrated in countries across the Atlantic. This may be partly attributable to the 'retail development level' of Atlantic-Rim countries including among others the UK, France and the US, which have continuously nurtured a series of retail innovations and have been the very active in pursuing retail internationalization. However, the rapid economic and retail development in other parts of the world, including Taiwan, over the last two decades, should have provided hints to researchers to enlarge the geographical scope in studying retail internationalization. Yet this is surprisingly not the case. So far studies on retail internationalization in regions other than the US and European countries seem to be inadequate compared to the increasing amount of retail internationalization activities in these regions.

This study adopts a micro-based individual level approach to studying retail internationalization, specifically the internationalization capability and potential of retail formats. For this purpose, four consumer survey datasets are exploited. These datasets provide the input data of retail choice and personal characteristics of individual consumers in Britain and Taiwan, thereby contributing to enlarge the geographical scope of retail internationalization studies from the Atlantic to the Pacific. Such a modification of the approach and the scope adds new blood to the current domain of retail internationalization studies.

6.1.1.8 Large-scale and nationally representative Internet shopping research

Following the rapid growth of the Internet in all fronts, studies on Internet usage and shopping have been accumulating steadily. Many of these studies used a relatively small sample, such as in Morganosky and Cude (2000). More importantly, a significant portion of these studies is based on consumer survey through the Internet, such as Georgia Tech Graphics, Visualization and Usability (GVU) Centre (1999), Wharton Virtual Test Market (WVTM), Lohse, Bellman and Johnson (2000), Bernoff, Morrisette and Clemmer (1998), Ernst and Young (2000), Nie and Erbring (2000), Bellman, Lohse and Johnson (1999), Donthu (1999). Although the Internet-based survey is efficient and involves low cost compared to other survey approaches such as face-to-face, mail and telephone, it suffers from low representativeness of the population because people who use the Internet are likely to be clearly different from the overall population (Sheehan and Hoy 1999). This hinders the external validity of any findings so derived.

One exception to the prevailing Internet-based survey approach for Internet shopping research is the study derived from the 'Global Electronic Commerce' Survey conducted by Taylor Nelson and Sofres. The Survey adopts a mix of face-to-face and telephone survey, and forgoes Internet survey, to monitor Internet usage and shopping among nearly thirty countries chosen. In addition, all the country samples for the Survey are nationally representative of respective countries.

This study recognizes that acquisition of large-scale and nationally representative samples is a key step towards the derivation of externally valid results, and therefore uses three samples all of which can contribute in

this regard. British 'Where People Shop' Survey adopts two stage stratified random sampling design and has a sample of more than 600 respondents. Taiwan Retail Format and Food Consumption Survey uses three stage stratified random sampling design and involves 1,200 respondents. Electronic Commerce Survey, which is a subset of the 'Global Electronic Commerce' Survey mentioned in the last paragraph, also carries the gene of representative sampling and includes 3,240 respondents for this study, with 2,200 for Britain and 1,000 for Taiwan.

Both this study and Taylor Nelson Sofres' original study as described above use samples that are large-scale and nationally representative. A major difference between them is concerned with the level of analysis. Taylor Nelson Sofres' study uses descriptive statistics, such as means and frequency distribution. This study, on the other hand, adopts a mix of multivariate and even unconventional statistical methods, such as ANOVA, pairwise comparison test, logistic regression and Poisson regression, in order to transform the data into implications that are often richer than those derived from descriptive statistics.

6.1.1.9 Integrative approach of Internet shopping research

Previous Internet shopping research has been carried out based on two approaches – intra-country approach and between-country approach. The former attempts to analyze Internet shopping behaviour and search consumer heterogeneity within a particular country, such as the US by Li, Kuo and Russell (1999), Austria by Schuster and Sporn (1998), and Singapore by Teo, Lim and Lai (1997). However, this approach in itself cannot tell anything in other than the country being studied. The latter, on the other hand, compares the Internet shopping phenomenon on a macro-based

country level. For example, Computer Industry Almanac (1999), Cyberatlas (2000) and Nua Publish (2001) provide valuable information about Internet use in many countries around the world. However, such country-level research cannot tell the heterogeneity of Internet use among the population within countries. As suggested by Prnewswire (1999), Internet consumer behaviours are different not only from region to region and country to country, but also between individuals who possess different attitudes.

This study is a first step to integrate the two prevailing approaches to research into shopping over the Internet, which has been noted as the most dramatic and far-reaching development ever made in information technology (Graham 1996). The approach is concerned with the integration of Internet shopping survey data of both Britain and Taiwan in a single study. As a result, not only within-country and between-country differences, if any, can be found, but pan-country similarity in the shape of cross-national consumer segments, if any, can also be identified.

Specifically, this study has found that Internet shoppers in Britain do not exhibit significant differences in any of the six demographic variables chosen, but those in Taiwan can be characterized by income level, with people in the top third category more likely to be involved in Internet shopping. It is also found that a significant macro-level difference in the percentage of people who are engaged in Internet shopping exists between the two countries across the two years of 1998 and 2000. Concerning the possibility of pan-country similarity, this study notes the absence of cross-national consumer segments because of the significance of the country variable. One further insight brought by the integrative approach, and is beyond the reach of the two prevailing approaches mentioned before, is the identification of the

relative importance of the global technology dimension and the national culture dimension in shaping consumer choice of Internet shopping. As has been shown elsewhere in this study, the latter dimension is found to exert greater influence over the former dimension, which places a constraint on the internationalization of the Internet across the globe.

6.1.2 Key issues moulding the findings

Conclusions in the previous sub-section basically arise from a substantive and integrative analysis of the findings presented in the last Chapter, and are of arguably *individualistic* nature in the sense that each of the conclusions are evaluated against a corresponding research objective noted in Chapter 1. This sub-section, on the other hand, discusses issues that are considered significantly influential in the overall composition, validity and practicability of the findings. Conclusions in this sub-section may be deemed *holistic* in nature.

Three issues are put forward. The first is concerned with the discrepancy between initial research thoughts and subsequent research directions, which exerts a huge impact on the overall composition of the findings. If initial research thoughts had been translated into action, the findings, in terms of structure and constituent parts, would have become very different. The second is about a scrutiny of the segmentation power as opposed to the predictive power of the results in this study, which plays a vital role in the overall validity of the findings. The validity as discussed here is not purely referred to statistical validity that has been tested in the last Chapter, but to substantive validity viewed from the segmentation perspective. The third is related to demonstrating the synergistic effect of integrating cross-national

and intra-national consumer segmentation research efforts, which greatly influences the overall practicability of utilizing the results of this study.

6.1.2.1 Discrepancy between initial thoughts and subsequent directions

During the very initial phase of the study, both retail formats and consumption trends were placed equal importance as the twin targets for the purpose of cross-national consumer segmentation. This is based on the belief, as noted in Chapter 1, that a more comprehensive scenario of the retail system in a particular market context can be grasped if its retail formats and consumption trends are both analyzed.

As the study progressed on, a 'full' cross-national consumer segmentation test, comprising all three stages of analysis (intra-country, inter-country and pan-country) has been conducted on retail formats as planned, but the same test on consumption trends has been 'partial' without stepping beyond the stage of intra-country analysis. As a result, greater research efforts have been placed on, and accordingly richer results have been drawn from the study of retail formats vis-à-vis consumption trends.

The predominant reason for such a discrepancy between initial research thoughts and subsequent research directions is the non-consistency of levels of analysis between British and Taiwanese consumption trend datasets. The former dataset has been collected at the household level and so refers to household consumption, while the latter dataset is interpreted at the individual level. It will be very erroneous to combine the two datasets for conducting inter-country and pan-country analyses.

This study once attempted to circumvent the problem by extracting a subset comprising single-adult households only, from the British dataset. The consumption data of this subset can then be confidently interpreted at the individual level. However, it is considered dangerous to combine this subset with the Taiwanese dataset for carrying out 'full' cross-national consumer segmentation research, because the data from the British subset are derived from each single-adult household in aggregate whilst those from the Taiwanese dataset correspond to ordinary households. A single-adult household is likely to possess some personal characteristics and exhibit some consumption patterns that are different from those of an ordinary household. Therefore, it is decided to totally abandon the idea of carrying out any inter-country and pan-country analysis for consumption trends. However, contemplating that intra-country analysis, the first stage of cross-national consumer segmentation analysis, can make academic and empirical contributions in its own right, different consumption trend datasets, as well as their appropriate subset, are analyzed in isolation. In the case of Britain, intra-country analysis has been conducted by using both the total household dataset and the single-adult household subset separately, contemplating that a scrutiny at the results arising from these two data sources may provide more precise representation about users of consumption trends in Britain on a general individual basis. Likewise, the Taiwanese household dataset on its own has also been used for intra-country analysis.

Clearly the change in research directions and data handling is fundamentally due to the fact that the data used are of secondary nature rather than collected for the purpose of this study. This illustrates the difficulty in obtaining comparability between two datasets that are collected separately by different research organizations. It is rare to have these two datasets

perfectly comparable to each other. On the other hand, it is more possible to have the two datasets 'sufficiently' comparable to each other, which means that with some logical deduction or realistic assumption, the two datasets can be made comparable. This occurs in the case of retail formats of this study. An unlucky outcome is that the two datasets cannot be logically deduced or realistically assumed to be comparable, as in the case of consumption trends of this study.

Although the use of secondary datasets inhibits this study from conducting a 'full' cross-national consumer segmentation study, it is not appropriate to contend that using secondary datasets is not a good choice of the study. As noted in Chapter 4, this study is treated as a piece of effects-application consumer research, which requires any result drawn to be generalizable to a larger population. However, it is impossible for the author of this study, as an independent researcher, to obtain representative samples in both Britain and Taiwan. Getting hold of appropriate secondary datasets is the only means of this study, and results of using these secondary datasets are considered fruitful as measured by the success in carrying out 'full' three-stage cross-national consumer segmentation on retail formats, and the first stage – intra-country analysis - of cross-national consumer segmentation on consumption trends.

6.1.2.2 Segmentation versus predictive powers

Altogether sixteen logistic regression reduced-model analyses have been conducted in this study. With the exception of the static pan-country traditional market model that poses some data fitting problem, maximum rescaled RSquares range from 0.0358 to 0.1490 (Table 6.5)[1], signifying that the

predictive powers of the independent variables, all of which are demographic variables, in these regression models are not high.

Table 6.5 – Maximum rescaled RSquares of logistic regression models

Segmentation targets	RSquare
Intra-country analysis	
Britain	
Internet	0.0836
Hypermarket/superstore	0.0370
Supermarket	0.0699
Traditional market	0.0358
Taiwan	
Internet	0.0511
Hypermarket/superstore	0.0700
Supermarket	0.0663
Traditional market	0.1884
Static pan-country analysis[1]	
Internet	0.0753
Hypermarket/superstore	0.0692
Supermarket	0.0451
Traditional market[2]	0.3628
Dynamic pan-country analysis	
Internet shopping	0.0539
Online music shopping	0.0421
Online book shopping	0.0364
Internet usage	0.1490

[1] Reduced models, rather than full models, are used because the latter, by incorporating all the hypothetical variables, are bound to increase Rsquare values in an unrealistic way.
[2] This model has a high probability value of Hosmer-Lemeshow goodness-of-fit statistic, and therefore does not fit the data well. As a result, the reliability of its high RSquare value is at doubt.

The lack of predictive powers of demographic variables in consumer behaviour has been noted for many years. A classic study is Frank, Massy and Boyd (1967), who, using Chicago Tribute panel data, regressed the effects of 14 socioeconomic variables on purchase quantity of 57 grocery products. Results show that the highest RSquare obtained is only 0.29, and about 50% of the resulting 57 regression models have RSquare of less than 0.1. Recently, Goldsmith, Freiden and Henderson (1997) also noted that

'demographic variables sometimes do a poor job of explaining variation in consumer behaviour'.

This led to some voices that market segmentation based on demographic variables is infeasible. However, this study suggests that the quality criterion of market segmentation is segmentation power, rather than predictive power.

The four static pan-country regression models are chosen for diagnosing into their segmentation power. Results show that the split of the usage probabilities between the heavy user segment and the light user segment is generally evident. Table 6.6 indicates a very clear split for each of the four retail formats, which are the segmentation targets of the four static pan-country regression models. This suggests that demographic variables are effective variables in segmentation research.

Table 6.6 – Description and usage probabilities of transnational heavy and light user segments of different retail formats

	Description	Usage probability
Internet		
Heavy user segment	Aged31-40 and employer/manager/professional and British	7.26%
Light user segment	Aged 61-70 and employer/manager/professional and Taiwanese	0.16%
Hypermarket/superstore		
Heavy user segment	Aged 31-40 and high income and four-person household and living in capital	73.89%
Light user segment	Aged 61-70 and low income and single-person household and not living in capital	22.84%
Supermarket		
Heavy user segment	Female and aged 21-30 and high income and living in capital	90.78%
Light user segment	Male and aged 61-70 and low income and not living in capital	50.34%
Traditional market		
Heavy user segment	Female and aged 61-70 and not middle income and seven-person household and Taiwanese	96.14%
Light user segment	Male and aged 31-40 and middle income and two-person household and British	7.88%

The reason for the divergence of performance between segmentation power and predictive power rests on the different levels of focus between the two. The essence of market segmentation is to group individuals displaying similar consumption patterns together, so the level of focus is 'group', rather than 'individual'. In contrast, RSquare is calculated on the basis of the regression model's ability to predict individual behaviour, which is not necessarily to be in tandem with group behaviour. In statistical terms, Bass, Tigert and Lonsdale (1968) attributed the lack of predictive power to great within-group variance, which does not imply that the relationship between

dependent variables and independent variables is insignificant. In this regard, Bass, Tigert and Lonsdale (1968) probed into the influence of a set of demographic variables such as age, occupation, income, and education on ten grocery product categories - catsup, frozen orange juice, pancake or waffle mix, candy bars, cake mix, beer, cream shampoo, hair spray, toothpaste, and mouthwash or oral antiseptic. As expected, the resulting ten regression models reported RSquare of less than 0.1 each. However, by using the regression coefficients of these models to estimate mean purchase rates for different segments, widely varying mean purchase rates between the heavy buyer and the light buyer segments were found (Table 6.7). For example, the purchase rate of catsup of heavy buyers is almost eight times as many as that of light buyers. This shows that demographic variables as a whole are a meaningful basis for market segmentation[2].

Table 6.7 – Heavy and light buyers by mean purchase rates*

Product	Heavy buyers	Light buyers	Ratio of highest to lowest rate
Catsup	2.73-5.89	0.74-1.82	7.8
Frozen orange juice	3.53-9.00	1.12-2.24	8.0
Pancake or waffle mix	1.10-1.51	0.48-0.52	3.3
Candy bars	6.56-22.29	1.01-4.31	21.9
Cake mix	2.22-3.80	0.55-1.10	6.9
Beer	17.26-40.30	0-12.33	Positive infinitive
Cream shampoo	0.44-0.87	0.16-0.35	5.5
Hair spray	0.52-1.68	0-0.41	Positive infinitive
Toothpaste	2.22-4.39	1.41-2.01	3.1
Mouthwash or oral antiseptic	0.98-1.17	0.46-0.85	2.5

*Purchase rate is meant purchase frequency, e.g. heavy buyers purchase 2.73-5.89 bottles of catsup a month
Source: Adapted from Bass, Tigert and Lonsdale (1968)

6.1.2.3 Integrating cross-national and intra-national analysis

The mainstream component of this study is to collapse datasets across countries for conducting cross-national consumer segmentation research. This kind of research is increasingly important in today's business world. As

competition has become more intense in domestic markets (Malhotra and Birks 2000), companies often find developing overseas markets lucrative, or even necessary for their survival. In this regard, cross-national consumer segmentation helps these companies in two aspects. First, it can determine whether the country factor is significant in determining the likelihood of consumers in the overseas countries being studied to use the target product sold by the company – if not, the company can consider embracing these countries as its internationalization targets. Second, again if the country factor is found non-significant, the company can look for any significant variable(s) found in the same cross-national consumer segmentation study as the base of segmentation, so that a more or less standardized marketing strategy in some areas, notably promotion, can be used across countries. This contributes to increase the output, usually in terms of profit, per unit of marketing input.

Notwithstanding treating cross-national consumer segmentation as the mainstream component, the study also places substantial efforts on analyzing individual datasets for intra-national consumer segmentation, whose findings are organized under the heading 'Intra-country analysis' in the last Chapter. This is not a usual practice in previous cross-national consumer segmentation studies (Douglas 1976; Yavas, Verhage and Green 1992/3). However, conducting intra-country analysis is considered practically beneficial in two ways for the implementation plan arising from the results of cross-national consumer segmentation.

First, as has been noted in the sub-section 6.1.1.3, if the country variable is significant and so cross-national consumer segments do not exist for the countries and the product being examined, a standardized marketing

strategy across countries is not likely to be successful, but a separate marketing strategy, drawn from the results of intra-country analysis, for each individual country being studied is feasible.

For example, this study has found that cross-national consumer segments of Internet shopping and traditional market shopping for Britain and Taiwan do not exist because of the significance of the country factor. Yet intra-country analysis, conducted in parallel to cross-national consumer segmentation, has found heavy user segments, in terms of usage rate, for the two retail formats. These segments are recapitulated in Table 6.8, which can be deployed by interested companies for designing a corresponding marketing strategy targeted at a specific country market of interest.

Table 6.8 – Heavy user segments of the Internet and the traditional market in Britain and Taiwan

Country Retail format	Characteristics of heavy user segments
Britain	
Internet	-
Traditional market	Male
Taiwan	
Internet	Higher income; Younger; Higher occupational class
Traditional market	Female; Older; Economically inactive; Larger household size

- no heavy user segment can be discerned

Second, although cross-national consumer segmentation may provide market information that cannot be available if individual countries are analyzed in isolation, it contains an inherent pitfall. Cross-national consumer segmentation, through collapsing datasets across countries, may bring blurring results that are not consistent with segmentation results within the individual countries being studied. Subsequently, a variable that is non-

significant in intra-country analysis may become significant in cross-national consumer segmentation research, such as 'region' for hypermarket/superstore shopping as well as 'gender' and 'income' for supermarket shopping. By the same token a significant variable in intra-country analysis may be non-significant in cross-national consumer segmentation research. This is very unlikely to be detected if intra-country analysis has not been carried out. Intra-country analysis helps to locate any cross-national consumer segmentation results that are less effective, or in the worst scenario, misleading.

However, cross-national consumer segmentation may highlight any significant variables that are consistent with but cannot be identified as significant in the results arising from intra-country analysis. In this sense, one can also argue against intra-country analysis as blurring the possible insights that can only be obtained through cross-national consumer segmentation research. For example, with regard to supermarket shopping, the 'region of residence' variable is non-significant in Britain, significant in Taiwan, and again significant across Britain and Taiwan. All these three pieces of segmentation results point to people living in the capital as more likely to use the supermarket, and so are consistent with each other. One can argue that the non-significance of the said variable in Britain is undeniable, but it is possible that such an outcome is due to a sampling error. Without cross-national consumer segmentation research, the prospect of identifying the said variable as a base for delineating a cross-national consumer segment of supermarket shopping may never be developed.

Cross-national consumer segmentation also helps to locate a possibility that some significant variables may be consistent with the results of intra-country

analysis, and therefore awaits further analysis for clarification. Examples in this study are 'age' and 'household size' for hypermarket/superstore shopping, as well as 'age' for supermarket shopping. Without conducting cross-national consumer segmentation research, the possibility of these variables as valid cross-national segmentation bases may never be opened up.

Lastly, cross-national consumer segmentation can provide very convincing results in which some variables should be above all the most effective cross-national segmentation variables, because they are significant and run in the same direction in the dataset that collapses all the considered datasets across countries, as well as within each of such considered country datasets. A prominent example is the 'income' variable for hypermarket/superstore shopping, as heavy hypermarket/superstore user segments are characterized as earning high per-capita income within Britain, within Taiwan, and across the two countries with 95% confidence level.

The aforesaid arguments and examples have demonstrated that cross-national and intra-national consumer segmentation efforts can supplement each other and subsequently produce synergistic effects by detecting blurring variables, highlighting hidden variables, locating possible variables and providing the most effective variables, thereby improving the overall practicability of the findings so presented. Therefore, this study advocates a deviation from the usual practice of previous cross-national consumer segmentation studies, in which intra-national analysis has not been adequately integrated into the mainstream cross-national analysis and its resultant interpretation, by performing a more integrative cross-national and intra-national consumer segmentation analysis.

6.2 Future research directions

Nine future research directions based on the insights of this study have been noted. Two of them are follow-ups of the limitations of the study, each of which will be elaborated in the following two paragraphs.

Chapter 4 has explained the adoption of secondary data as an appropriate choice in this study. Accordingly, four national survey datasets form the basis upon which the analysis is undertaken. Every choice has its advantages and disadvantages. Making a choice implies relinquishing an alternative choice, and is necessarily a trade-off such as what everyone faces in everyday life. The choice of secondary data analysis and its concomitant four national survey datasets has its limitations that have been elaborated in the research design Chapter. The most significant one that occurs in this study has also been discussed in a previous sub-section. Yet these limitations are 'necessary evils' that have to be accepted because the choice that entails these limitations is considered the best possible one for achieving the research objectives set up in the beginning of the study. Considering the value as expressed in the research objectives of Chapter 1 and the conclusions of this Chapter, it will be beneficial for the academic community if a similar study that depends on tailor-made surveys is taken, thereby avoiding the disadvantages of secondary data analysis. However, the scale of such a study is so large that is probably only affordable by an international research organization.

Besides the above limitation-induced research direction, this study acknowledges one other limitation that is not inherent in the research design process and that induces a respective research direction. This is the use of

small samples – 30 in British sample and 16 in Taiwanese sample – for identifying the products that represent the convenience and health trends. Fortunately, as a multivariate measure – count number of the occurrence of purchase/consumption of a variety of products representing each trend – is used, any possible deviation from the fact, say occurrence recorded but non-occurrence in reality, of a particular product is averaged out from another product that deviates in an opposite direction, i.e. non-occurrence recorded but occurrence in reality. Nevertheless, the use of larger samples in any future study can even more exactly identify the products representing convenience and health trends.

Seven future research directions, other than the two limitation-induced ones discussed above, could be considered by any academician who is interested in and around the topic of this study. Firstly, it is highly desirable to incorporate more countries in cross-national consumer segmentation analysis of any segmentation target considered in this study. The inclusion of a greater number of countries provides greater credence to any conclusion drawn comparable to that of this study, such as the formation of cross-national consumer segments or the relative influence of the global technology dimension and the national country dimension. It may also bring to some unexpected yet interesting results, such as those that shed light on the cultural groupings of countries included.

Secondly, this study uses demographic variables as a proxy of intra-country differences that are to be weighted against between-country differences with regard to their impacts of a number of retail formats. Demographic variables are chosen for a number of reasons that have already been explained in Chapter 4. Undeniably, demographic variables cannot account for all the

intra-country differences. Lifestyle variables constitute another important type of intra-country differences. So a similar possible study that incorporates both demographic and lifestyle variables for representing intra-country differences will hopefully provide added contributions.

Thirdly, this study has found that the national-culture dimension is significantly manipulating consumer choice of Internet shopping, and is not significantly influential in the choice of hypermarket/superstore and supermarket shopping, from the consumer market's point of view. It will be interesting and hopefully provide further credence to the conclusions of this study if a corresponding study is undertaken from the retailers' perspective. This involves conducting surveys of Internet, hypermarket, superstore and supermarket retailers by probing into their experiences of cross-national market segmentation efforts (if any) and perceptions of the importance of the national-culture dimension during the course of retail internationalization efforts.

Fourthly, in the case of the Internet that is still a very young phenomenon, it is suggested to keep abreast of the trend of the relative influence of the global technology dimension and the national country dimension, which hopefully will contribute to the drawing up of a number of kick off time points of the development of Internet shopping. For example, a kick off time point may be that global technology begins to outweigh national country with regard to their respective impact on the diffusion of Internet shopping. Another kick off time point is probably concerned with, among a group of culturally similar countries, the identification of the stage of economic development in which the impact of global technology begins to take shape.

Fifthly, in the earlier part of this Chapter, it has been suggested that there are very probably some factors, other than general economic factors or innovation diffusion factor, which contribute to the difference in usage rates of Internet shopping between Britain and Taiwan. It will be both academically and empirically insightful to search for these factors.

Sixthly, convenience and health trends are allegedly important and evident trends across consumption societies. These trends are manifest not only in the food sector, but also in a variety of non-food sectors, such as mobile phone, consumer electronics, and health resorts. It is suggested to consider these trends in a diverse number of sectors altogether so that a measure of general convenience and health trends not particularly biased to a particular sector can be derived and put forward for further analysis.

Lastly, this study has demonstrated the great academic potential of using established national survey datasets. National survey datasets of varying kinds have been and continue to be produced in most countries. For marketing academicians or practitioners, these datasets are currently used in a way that only their published results (e.g. per capita consumption of a particular product in a given country) are referred to. However, a much greater academic and/or practical value can be extracted from using them in their original data format. It will contribute much to the marketing community if a continuous search for national survey datasets, topics of which are not restricted to those adopted in this study, in different countries is conducted. This helps to identify similar datasets that are comparable to each other across countries for the purpose of corresponding cross-national consumer research.

Note

[1] Besides the ten logistic regression models, four Poisson regression models have also been conducted. Yet Maximum Rescaled Rsquare or Rsquare statistic is not available for Poisson regression modeling.

[2] Although the study quoted in this paragraph are old, the explanations and implications arising from these studies are believed to be still valid over time. Challenges against any part of this study have not been found.

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Appendix – Questionnaires

1. British 'Where People Shop' Survey

WHERE PEOPLE SHOP - GB

SHOWCARD

Q.1 Which of these types of outlets do you use nowadays for food shopping?

(M)

Supermarkets in the town centre
Other town centre/high street shops
Edge/out of town supermarkets/hypermarkets
Local shops in neighbourhood
Markets
Farm shop
Petrol stations
Home delivery services (eg milk, wine)

SHOWCARD

Q.2 Which food outlet do you use most often for your main food shopping?

(S)

Aldi
Asda
Budgens
Co-op
Gateway/Somerfield
Iceland
Kwiksave
LIDL
Marks & Spencer
Morrisons
Netto
Safeway
Sainsbury
Tesco
Waitrose
Other (please specify)

Q.3 How often do you shop for main food items?

(S)

Every day
Two to three times a week
Once a week
Once a fortnight
Once a month
Less often
ALLOW DK

Q.4 When conducting you main food shopping, which method of transport do you usually use?

CODE MAIN METHOD ONLY

(S)

Bicycle
Bus
Car - drive self
Car - get lift
Motorbike
Tube
Train
Tram
Taxi
Walk
ALLOW DK

Q.5 Which of these services do you use nowadays in your main supermarket?
CODE NULL FOR NONE OF THESE

(M)

Assistance with packing
Express tills (for limited number of items)
Self scanners/self service scanners
Home delivery service
Loyalty scheme (offering some discount)
Cash machines for banks
The supermarkets own bank
Free car parking
Toilets
Newsagent
Photo-copying
Dry cleaning
Shoe repairs
Creche/play area for children

SHOWCARD

Q.6 How important is it to you that the following services are offered in your main supermarket?

ROTATE ORDER OF SERVICES ASKED

Assistance with packing
Loyalty scheme (offering some discount)
Cash machines for banks
The supermarkets own bank
Dry cleaning
Creche/play area for children
Post office
Pharmacy

Precodes for each service:

(S)

Very important
Fairly important
Neither important nor unimportant
Not very important
Not at all important
ALLOW DK

SHOWCARD

Q7 Which of these alternative methods of shopping have you ever used?
CODE NULL FOR NONE OF THESE

(M)

Home delivery service
Pre-order and collection service (drive through)
Satellite/cable Television/minitel
Electronic methods (eg Internet)
ALLOW NULL

Q.8 Please tell me how strongly you agree or disagree with the following statements about food shopping...

ROTATE ORDER OF STATEMENTS ASKED

I do not usually look at the country of origin of food I'm buying
I try to buy *(own nationality)* if there is a choice
I buy fresh rather than frozen
I would prefer to buy organically grown fruit & vegetables
I always try to buy animal produce that has not been factory farmed
I would not buy produce that have been genetically modified
I believe the selection of food has improved over the last 3 years

Supermarkets should be open on Sundays

Precodes:

(S)

Agree strongly
Agree slightly
Neither agree nor disagree
Disagree slightly
Disagree strongly
ALLOW DK

Annex A3
GB Data Positions

The Capibus Europe classification data is to be recorded on card class 1 as follows.

Data	Column
Serial number	**(1-5)**
Card number	**(6-7)**

Country **(8)**
GB 6

Sex **(9)**
Male 1
Female 2

Age
Exact Age (10-11)

Main shopper **(12)**
Yes 1
No 2

CIE **(13)**
Yes 1
No 2

Lifestage **(14)**
Dependants (Under 40, not married or cohabiting, not responsible for household) 1
Single (single under 40, responsible for household) 2
Pre family (Under 40, married or cohabiting, head of household or housewife, no children aged 0-14 living in household) 3
Family (Children aged 0-14 living in household) 4
Post family (40+, no children, chief income earner still earning) 5
Retired (40+, no children, chief income earner retired) 6

Occupation of CIE (Chief Income Earner)		**(15)**
Managerial/Professional (including self-employed professional)		1
Clerical Employee		2
Manual Employee		3
Self-employed (excluding self-employed professional)		4
Retired	5	
Unemployed/not economically active	6	

Annual Household Income	**(16)**
Top (£17,500+)	1
Middle (£9,500 - £17,499)	2
Bottom (Less than £9,500)	3

Region bands		**(17)**
Scotland		-
Wales		0
North		1
North West		2
Yorks. & Humberside	3	
West Midlands		4
East Midlands		5
East Anglia		6
South West		7
South East		8
London		9

Region Grouping	**1(17)**
Scotland	-
North	1-3
Midlands	4-6, 0
South	7-8
London	9

Working status of respondent	**(20)**
Active	1
Inactive	2

Number of individuals in HH	**(21)**
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8 and more	8

Children in household	**(22)**
Yes	1
No	2

Number of children	**(23)**
1	1
2	2
3	3
4	4
5+	5

Spare (24)

Marital Status	**(25)**
Married/living as married	1
Single	2

Age bands	**(26)**
15-17	1
18-24	2
25-34	3
35-44	4
45-54	5
55-59	6
60-64	7
65-74	8
75+	9

Income bands (Annual)		**(27)**
Less than 2,500 pounds		1
2,500 - 4,499 pounds	2	
4,500 - 6,499 pounds	3	
6,500 - 7, 499 pounds	4	
7,500 - 9,499 pounds	5	
9,500 - 11,499 pounds	6	
11,500 - 13,499 pounds		7
13,500 - 15, 499 pounds		8
15,500 - 17,499 pounds		9
		(28)
17,500 - 24,999 pounds		0
25,000 - 34,999 pounds		1
35,000 - 39 999 pounds		2
40,000 - 59,999 pounds		3
60,000 - 100,000 pounds		4
More than 100,000 pounds		5

Education level (Terminal Education Age)	**(29)**
13-14	1

15	2
16	3
17-18	4
19	5

Age of children in HH	**(30)**
0-6	1
7-14	2

New Technology	**(32-33)**
Cable TV	1
Satellite TV	2
Digital TV	3
VCR	4
DVD Player	5
Mobile Phone	6
Digital Camera	7
PC/Laptop	8
Video Games Console	9
	(33)
Internet Access (Home)	0
Internet Access (Work)	1
None of these	(32) '-'

Weighting	(71-80)

to four decimal places eg 1.2345, right adjusted.

2. Taiwan Retail Format and Food Consumption Survey

(This questionnaire is a translated version of the original questionnaire, which is written in Chinese. It is also a simplified version, with the intent to outline the essence of the original questionnaire)

Retail Format Choice

Format type	Did you use it in the last year		Did you use it in the last month	
Traditional food market	☐ Yes	☐ No	☐ Yes	☐ No
Hawker	☐ Yes	☐ No	☐ Yes	☐ No
Supermarket	☐ Yes	☐ No	☐ Yes	☐ No
General merchandise store	☐ Yes	☐ No	☐ Yes	☐ No
Cooperative	☐ Yes	☐ No	☐ Yes	☐ No
Convenience store	☐ Yes	☐ No	☐ Yes	☐ No
Traditional grocery store	☐ Yes	☐ No	☐ Yes	☐ No
Rice store / Grain store	☐ Yes	☐ No	☐ Yes	☐ No
Edible oil store	☐ Yes	☐ No	☐ Yes	☐ No
Bakery shop	☐ Yes	☐ No	☐ Yes	☐ No
Betal nut stand	☐ Yes	☐ No	☐ Yes	☐ No
Fruit store	☐ Yes	☐ No	☐ Yes	☐ No
Automatic vending machine	☐ Yes	☐ No	☐ Yes	☐ No
Direct selling	☐ Yes	☐ No	☐ Yes	☐ No
Television shopping	☐ Yes	☐ No	☐ Yes	☐ No
Catalogue buying	☐ Yes	☐ No	☐ Yes	☐ No
Internet buying	☐ Yes	☐ No	☐ Yes	☐ No

FOOD CONSUMPTION BEHAVIOUR

Product item	Did you consume in the last year	Did you consume in the last month	Which brand did you consume most in the last year	Which variety/flavour/package did you consume most in the last year	If you can't buy it for whatever reason, what was your second choice on average in the last year
A	☐ Yes ☐ No	☐ Yes ☐ No	☐ 01 ☐ 02 ☐ 03 ☐ 04 ☐ 05 ☐ 06 ☐ 06 ☐ 08 ☐ 09 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14 ☐ 15 ☐ 16 ☐ 17 ☐ 18 ☐ 99	a. Variety ☐ 01 ☐ 02 ☐ 03 b. Flavour ☐ 01 ☐ 02 ☐ 03 ☐ 04 ☐ 05 ☐ 06 ☐ 07 ☐ 99	☐ 01 ☐ 02 ☐ 03 ☐ 04 ☐ 05 ☐ 06 ☐ 97 ☐ 99
B	☐ Yes ☐ No	☐ Yes ☐ No	☐ 01 ☐ 02 ☐ 03 ☐ 04 ☐ 05 ☐ 06 ☐ 07 ☐ 08 ☐ 09 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14 ☐ 15 ☐ 16 ☐ 99	a. Variety ☐ 01 ☐ 02 b. Flavour ☐ 01 ☐ 02 ☐ 03 ☐ 04 ☐ 05 ☐ 06 ☐ 07 ☐ 99	☐ 01 ☐ 02 ☐ 03 ☐ 04 ☐ 05 ☐ 06 ☐ 97 ☐ 99
C	☐ Yes ☐ No	☐ Yes ☐ No	☐ 01 ☐ 02 ☐ 03 ☐ 04 ☐ 05 ☐ 06 ☐ 07 ☐ 08 ☐ 99		☐ 01 ☐ 02 ☐ 03 ☐ 04 ☐ 05 ☐ 06 ☐ 97 ☐ 99
D	☐ Yes ☐ No	☐ Yes ☐ No	☐ 01 ☐ 02 ☐ 03 ☐ 04 ☐ 05 ☐ 06 ☐ 07 ☐ 08 ☐ 09 ☐ 10 ☐ 11 ☐ 99	☐ 01 ☐ 02 ☐ 03 ☐ 04 ☐ 05 ☐ 06 ☐ 07 ☐ 99	☐ 01 ☐ 02 ☐ 03 ☐ 04 ☐ 05 ☐ 06 ☐ 97 ☐ 99
E	☐ Yes ☐ No	☐ Yes ☐ No	☐ 01 ☐ 02 ☐ 03 ☐ 04 ☐ 05 ☐ 99	☐ 01 ☐ 02 ☐ 99	
F	☐ Yes ☐ No	☐ Yes ☐ No	☐ 01 ☐ 02 ☐ 03 ☐ 04 ☐ 05 ☐ 06 ☐ 07 ☐ 08 ☐ 09 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14 ☐ 15 ☐ 16 ☐ 17 ☐ 18 ☐ 99	a. Variety - 1 ☐ 01 ☐ 02 a. Variety - 2 ☐ 01 ☐ 02 ☐ 03 a. Variety - 3 ☐ 01 ☐ 02 Flavour ☐ 01 ☐ 02 ☐ 03 ☐ 04 ☐ 99	
G	☐ Yes ☐ No	☐ Yes ☐ No	☐ 01 ☐ 02 ☐ 03 ☐ 04 ☐ 05 ☐ 06 ☐ 07 ☐ 08 ☐ 09 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14 ☐ 99	a. Variety ☐ 01 ☐ 02 b. Flavour ☐ 01 ☐ 02 ☐ 03 ☐ 04 ☐ 99 c. Package ☐ 01 ☐ 02 ☐ 99	

BACKGROUND INFORMATION

1. Gender	01. □ Male	02. □ Female			
2. Age	01. □ 15-20	02. □ 21-30	03. □ 31-40		
	04. □ 41-50	05. □ 51-60	06. □ 61-70		
3. Educational level	01. □ Primary school or below	02. □ Secondary school	03. □ College or undergraduate		
	04. □ Postgraduate				
4. Occupation	01. □ Housewife	02. □ Boss or department head	03. □ Brain working employee		
	04. □ Labourer	05. □ Seeking a job	06. □ Student		
	07. □ Others :				
5. Marital status	01. □ Single	02. □ Married	03. □ Divorced or widowed		
6. Religious belief	01. □ Catholicism / Protestantism	02. □ Buddhism	03. □ I-Kuan Tao		
	04. □ Muslim	05. □ Taoism	06. □ None		
	07. □ Others :				
7. Blood type	01. □ A	02. □ B	03. □ O		
	04. □ AB				
8. Horoscope / star	01. □ Aries (21/3-20/4)	02. □ Taurus (21/4-20/5)	03. □ Gemini (21/5-21/6)		
	04. □ Cancer (22/6-23/7)	05. □ Leo (24/7-23/8)	06. □ Virgo (24/8-22/9)		
	07. □ Libra (23/9-22/10)	08. □ Scorpio (23/10-22/11)	09. □ Sagittarius (23/11-22/12)		
	10. □ Capricorn (23/12-20/1)	11. □ Aquarius (21/1-19/2)	12. □ Pisces (20/2-20/3)		
9. Your monthly income	01. □ NT$ 20,000 or below	02. □ NT$ 20,000 - 30,000	03. □ NT$ 30,000 - 40,000		
	04. □ NT$ 40,000 - 50,000	05. □ NT$ 50,000 - 60,000	06. □ NT$ 60,000 - 70,000		
	07. □ NT$ 70,000 - 80,000	08. □ NT$ 80,000 or above	09. □ NT$ 20,000 - 30,000		
10. Family monthly income	01. □ NT$ 20,000 or below	02. □ NT$ 20,000 - 30,000	03. □ NT$ 30,000 - 40,000		
	04. □ NT$ 40,000 - 50,000	05. □ NT$ 50,000 - 60,000	06. □ NT$ 60,000 - 70,000		
	07. □ NT$ 70,000 - 80,000	08. □ NT$ 80,000 - 90,000	09. □ NT$ 90,000 - 100,000		
	10. □ NT$ 100,000 - 110,000	11. □ NT$ 110,000 - 120,000	12. □ NT$ 120,000 - 130,000		
	13. □ NT$ 130,000 - 140,000	14. □ NT$ 140,000 or above			
11. Number of members in the household (including yourself)	01. □ one	02. □ two	03. □ three	04. □ four	05. □ five 06. □ six
	07. □ seven	08. □ eight	09. □ nine	10. □ ten or above	

ATTITUDE

	1. Extremely	2. Very	3. Rather	4. Rather	5. Very	6. Extremely	
Traditional	☐	☐	☐	☐	☐	☐	Open-minded
Extrovert	☐	☐	☐	☐	☐	☐	Introvert
Sophisticated lifestyle	☐	☐	☐	☐	☐	☐	Simple lifestyle
Passionate	☐	☐	☐	☐	☐	☐	Rational
Stable mood	☐	☐	☐	☐	☐	☐	Unstable mood
Career minded	☐	☐	☐	☐	☐	☐	Not career minded
Adventurous	☐	☐	☐	☐	☐	☐	Cautious
Fancy famous brands	☐	☐	☐	☐	☐	☐	Apathetic to famous brands
Trust the advertisement	☐	☐	☐	☐	☐	☐	Mistrust the advertisement
Budget conscious	☐	☐	☐	☐	☐	☐	Budget indifferent
Attend to food sanitation	☐	☐	☐	☐	☐	☐	Apathetic to food sanitation
Attend to food nutrition	☐	☐	☐	☐	☐	☐	Apathetic to food nutrition
Fancy imported products	☐	☐	☐	☐	☐	☐	Apathetic to imported products
Enthusiastic about leisure life	☐	☐	☐	☐	☐	☐	Apathetic to leisure activities
Sensitive to store decoration	☐	☐	☐	☐	☐	☐	Insensitive to store decoration
Like watching TV	☐	☐	☐	☐	☐	☐	Dislike watching television
Like sports activities	☐	☐	☐	☐	☐	☐	Dislike sports activities
Attend to the fad	☐	☐	☐	☐	☐	☐	Apathetic to the fad

3. Electronic Commerce Survey

(This questionnaire is essentially a file facilitating data key-in. The file was obtained from Taylor Nelson Sofres, who took charge of the Survey)

Case/card # cols 1 0

Card No.	Start Col.	Width Cols.	Items	Total Cols.	Variable
1	1	1	1	1	Q1.Have you personally used the internet in the past month
1	2	1	1	1	Q2.Filter
1	3	1	1	1	Q2-1.Have bought or order
1	4	1	1	1	Q2-2.Have considered buying
1	5	1	1	1	Q2-3.Have bought...outside of the internet
1	6	1	1	1	Q2-4.Plan on buying
1	7	1	1	1	Q2-5.None of the above
1	8	1	1	1	Q2-6.Dont know/Cant recall
1	9	1	1	1	Q3.Filter
1	10	1	1	1	Q3-1.Groceries/food
1	11	1	1	1	Q3-2.Clothes
1	12	1	1	1	Q3-3.Jewellry/Fashion accessories
1	13	1	1	1	Q3-4.Toys/Games
1	14	1	1	1	Q3-5.Music/CDs
1	15	1	1	1	Q3-6.Videos
1	16	1	1	1	Q3-7.Books
1	17	1	1	1	Q3-8.Sports Equipment
1	18	1	1	1	Q3-9.Furniture/Household furnishings
1	19	1	1	1	Q3-10.Electronics/Electrical goods
1	20	1	1	1	Q3-11.PC Hardware
1	21	1	1	1	Q3-12.PC Software
1	22	1	1	1	Q3-13.Travel (Business only)
1	23	1	1	1	Q3-14.Holidays/Leisure travel
1	24	1	1	1	Q3-15.Tickets to theatre/cinema etc
1	25	1	1	1	Q3-16.Toiletries/Cosmetics
1	26	1	1	1	Q3-17.Stocks/Shares/Mutual funds
1	27	1	1	1	Q3-18.Car
1	28	1	1	1	Q3-19.Others
1	29	1	1	1	Q3-20.Dont know/Cant recall
1	30	1	1	1	Sex
1	31	2	1	2	Q1.Actual Age
1	33	2	1	2	Country
1	35	7	1	7	Weight for Ulf

4. British National Food Survey

4084

NATIONAL FOOD SURVEY 1998
QUESTIONNAIRE

Office for National Statistics
Central Survey Unit

INTERVIEWER NAME ..... INTERVIEWER NO. [ ][ ][ ][ ]

A SURVEY MONTH (01 - 12)
[JAN = 01, FEB = 02 ETC] [ ][ ]

C QUOTA NUMBER [ ][ ][ ][ ][ ]

ADDRESS (01-28) & HOUSEHOLD NUMBER (1-3) [ ][ ] Address [ ] Hsehld

Is this household in the sample as.....

Main Diary only 1

Main Diary plus Eating Out? 2

If ONE household per address:
Even address no. = Main + EO

For concealed multi-households at any address:
Even hhld no. = Main + EO

D Date of first interview
[TWO DIGITS FOR DAY AND MONTH] [ ] Day [ ] Month 98 Year

E Does your household own or have the use of ....

	Yes	No
a microwave oven?	1	2
a separate deep freeze or a fridge-freezer?	1	2

[A FRIDGE-FREEZER HAS A FRIDGE WITH ITS OWN DOOR COMBINED WITH A FREEZER WITH ITS OWN DOOR]

F Does your household grow or receive free any of following home grown or home produced items?

Yes 1

No 2

SHOW CARD A: HOME PRODUCE

[NB INCLUDE ONLY HOME GROWN ITEMS WHICH ARE AVAILABLE NOW]
IF YES, LIST BELOW

.....

REMEMBER - ENTER IN SECTION 4 OF THE DIARY JUST THE QUANTITY TAKEN FROM STOCKS ON THE DAY IT IS TAKEN OUT

H Does your household have any milk delivered to your home? Yes 1

No 2

	(i)	(ii)	(iii)
What types of milk? FULL CREAM/ SKIMMED/ SEMI ... PASTEURISED/ STERILISED/.....	.....	.....	.....
How much per pint (or litre)?	.....	.....	.....
How many pints/litres per week?	.....	.....	.....
INTERVIEWER RING	pints/ litres	pints/ litres	pints/ itres

Can I just check please: Is anyone in this household pregnant? Yes 1
[ASK OR RECORD]

No 2

IF YES, WRITE IN PERSON NUMBER(s)
AFTER FILLING IN GRID ON NEXT PAGE .....

TENURE

J (i) In which of these ways do you occupy this accommodation?
[SHOW CARD. RING ONE ONLY]

Own it outright		1
Buying it with the help of a mortgage or loan		2
Shared ownership (pay part rent and part mortgage)		3
Rent it		4
Live here rent-free	(including rent-free in relative/ friend's property ; excluding squatting)	5
Squatting		6

J (ii)

IF RENT OR RENT-FREE ASK ALL QUESTIONS IN BOX

J (ii) **Does the accommodation go with the job of anyone in the household?**

Yes	1
No	2

J (iii) **Who is your landlord?**
[CODE FIRST THAT APPLIES]

Organisations	
the local authority/ council/ New Town Development/ Scottish Homes	1
a housing association/ co-operative/ charitable trust	2
employer (organisation) of a household member	3
another organisation ?	4
Individuals	
relative/ friend (before you lived here) of household member	5
employer (individual) of a household member	6
another individual private landlord	7

(iv) **Is the accommodation provided :**

furnished	1
partly furnished	2
or unfurnished	3

ASK ALL - HOUSING BENEFIT

K Is housing benefit received?

Yes	1
No	2

USUAL MEMBERS OF HOUSEHOLD (incl MDK and HOH even if absent)
AND
REGULAR VISITORS (4 nights or more)

REGULAR VISITORS: THESE CAN BE COMPLETELY CODED FROM THE MAIN DIARY AFTER THE FINAL INTERVIEW
DO NOT ASK OCCUPATION: OCC = 006 (aged 0-15) or 007 (aged 16+).
WORKING CODE = 0

Person No. (Ring HOH)	Relationship to Main Diary Keeper (MDK)	Sex M F	Age last birthday (DK = 999)	Pregnant 1= Yes 2 = No/ Not apply	Working Code (see below) code 0-4	INTERVIEWER CODE OCC (3 digits)	INTERVIEWER CODE Net Balance (Deduct meals from 100)
1	MDK	1 2		1 2			
2		1 2		1 2			
3		1 2		1 2			
4		1 2		1 2			
5		1 2		1 2			
6		1 2		1 2			

Head of Household
[RING PERSON NUMBER]

IF THE HOUSEHOLD COMPRISES HUSBAND + WIFE... OR HUSBAND + WIFE & CHILDREN < 16, HOH = HUSBAND.

IF MORE THAN ONE PERSON IN HOUSEHOLD WITH AGE >= 16 ASK:

In whose name is the accommodation owned or rented?

Working Code [WRITE CODE IN BOX]

For the 7 days ending last Sunday, were you working.....

Economically active:	Code
Full time incl Govt training (over 30 hrs/wk)	1
Part-time (over 10 hrs to 30 hrs/wk)	2
Unemployed less than a year	3
Full or part-time, but sick or on holiday	4

Economically Inactive:	
Not working	)
Work 10 hrs per week or less	)
Full time Education	) 0
Retired	)
Unemployed 1 yr or more ?	)

OCCUPATION/ DESCRIBE WHAT DOING

ASK MDK ON BEHALF OF HOUSEHOLD IF WORKING, OR UNEMPLOYED FOR LESS THAN A YEAR (ie CODE 1,2,3 or 4) [WRITE IN BOX] (a) What is/was your/...'s (main) job? (b) What do/did you/.... mainly do in your job? (c) What does/did the firm/organisation mainly make or do? IF NOT WORKING (ie CODE 0]: DESCRIBE WHAT DOING (EG SCHOOL, RETIRED)	(d) Employee or Self-Employed? (e) Any managerial duties? (see below)	(f) Size of organisation? (see below)
(a/b) Occ: (c) Ind:	Employee = 1 Self-Emp = 2 Manager = 1 Foreman = 2 Neither = 3	0 (SELF EMP) = 0 1-24 = 1 25 or more = 2
(a/b) Occ: (c) Ind:	Employee = 1 Self-Emp = 2 Manager = 1 Foreman = 2 Neither = 3	0 (SELF EMP) = 0 1-24 = 1 25 or more = 2
(a/b) Occ: (c) Ind:	Employee = 1 Self-Emp = 2 Manager = 1 Foreman = 2 Neither = 3	-0 (SELF EMP) = 0 1-24 = 1 25 or more = 2
(a/b) Occ: (c) Ind:	Employee = 1 Self-Emp = 2 Manager = 1 Foreman = 2 Neither = 3	0 (SELF EMP) = 0 1-24 = 1 25 or more = 2
(a/b) Occ: (c) Ind:	Employee = 1 Self-Emp = 2 Manager = 1 Foreman = 2 Neither = 3	0 (SELF EMP) = 0 1-24 = 1 25 or more = 2
(a/b) Occ: (c) Ind:	Employee = 1 Self-Emp = 2 Manager = 1 Foreman = 2 Neither = 3	0 (SELF EMP) = 0 1-24 = 1 25 or more = 2

OCCUPATION [RING CODE IN BOX]

(d) Are/were you working as an employee or were you self employed?

an employee?	1
self employed?	2

ASK EMPLOYEES ONLY

(e) Do/ did you/ ... have any managerial duties, or were you supervising any other employees?

Manager	1
Foreman/supervisor	2
Neither?	3

ASK BOTH EMPLOYEES AND SELF EMPLOYED

(f) EMPLOYEE: How many people work(ed) at the establishment?
SELF EMPLOYED: How many people do/did you/ ... employ at the place where you worked?

None (SELF EMP ONLY)	0
1 - 24	1
25 or more	2

INCOME

ASK MDK ON BEHALF OF HOUSEHOLD.
BUT IF POSSIBLE, FIND OUT INCOME FROM PERSON RECEIVING INCOME. CONSULT WAGE SLIPS ETC.

ELIGIBILITY: ALL USUAL MEMBERS OF HOUSEHOLD ONLY.
EXCLUDE: REGULAR OR OCCASIONAL VISITORS; BOARDERS OR LODGERS
ALL INCOME SOURCES: PART TIME WORK; UNEMPLOYED; CHILDREN'S SATURDAY JOBS

---

i) Income source:
This card shows various possible sources of income. Can you tell me what kinds of income you and your household receive (PROMPT)?

SHOW SOURCES OF INCOME CARD

RECORD INCOME SOURCE AGAINST EACH PERSON ON GRID OPPOSITE

IF CHILDREN, PROMPT FOR CHILD BENEFIT AND ONE-PARENT BENEFIT
CHILD BENEFIT IS CODED OPPOSITE THE WOMAN, UNLESS LONE MALE PARENT, AND IS NET + ACTUAL.
DO NOT INCLUDE HOUSING BENEFIT

FOR EACH PERSON IN TURN, AND FOR EACH INCOME SOURCE:

ii) Income
How much was paid, the last time it was paid?
[LAST TIME PAID, EVEN IF UNTYPICAL:
INCLUDE OVERTIME, BONUSES, TIPS]

NET (= TAKE HOME PAY, AFTER ALL DEDUCTIONS) PREFERRED ;
BUT FOR HOH ASK FOR BOTH NET AND
GROSS (= BEFORE DEDUCTIONS)

ASK SELF EMPLOYED
What was your income from this job/business, after paying expenses and wages, for the most recent period (eg 12 months) for which you have figures?
CHECK: Is that with tax and National Insurance deducted?

GROSS = Expenses/wages deducted
NET = Tax and NI also deducted.

iii) CODE WHETHER THE INCOME IS NET OR GROSS

iv) CODE WHETHER THE INCOME IS ACTUAL, ESTIMATED OR CARD

OBTAIN IN ORDER OF PREFERENCE: ACTUAL, ESTIMATE, AMOUNT FROM CARDS (C, D, E, F)

v) Frequency:
How long does this cover?
(PROMPT: HOW OFTEN IS THAT PAID, WEEKLY, MONTHLY...?)

IF MONTHLY, CHECK WHETHER CALENDAR MONTH OR 4 WEEKLY

F ANY INDIVIDUAL INCOMES OF ADULT MEMBERS ARE MISSING , ESTIMATE NET HOUSEHOLD INCOME

Could you estimate the total household income each week?
(after ALL deductions for income tax , National Insurance, etc)

SHOW INCOME CARD G or if necessary SHOW INCOME CARD H

WRITE IN CODE LETTERS OF INCOME BAND .....

ICOME GRID

on	Income source (Show card) Description or code	Income (Enter amount or card code) £	P	Net or Gross ? Net Gross	Actual, Estimate, or Card? Actual Estimated Card	Frequency of receiving (wkly, mnthly, fortnightly, 4 wkly, etc)	INTERVIEWER CODE CALCULATE OR WRITE IN: NET WEEKLY INCOME FROM EACH SOURCE	GROSS WKLY INCOME OF HOH (OR XHOH)
	1a			N G	A E C			
	1b			N G	A E C			
	1c			N G	A E C			
	1d			N G	A E C			
	2a			N G	A E C			
	2b			N G	A E C			
	2c			N G	A E C			
	2d			N G	A E C			
	3a			N G	A E C			
	3b			N G	A E C			
	3c			N G	A E C			
	4a			N G	A E C			
	4b			N G	A E C			
	4c			N G	A E C			
	5a			N G	A E C			
	5b			N G	A E C			
	5c			N G	A E C			
	6a			N G	A E C			
	6b			N G	A E C			
	6c			N G	A E C			

VIEWER CODE: TOTAL NET WEEKLY HOUSEHOLD INCOME

VIEWER CODE : GROSS WEEKLY INCOME OF HOH
(OR CROSS-OVER HOH IF THERE IS ONE)

SK ALL HOUSEHOLDS WITH CHILDREN AT SCHOOL
nclude those aged 4 in reception class of primary school, but exclude nurseries]

Does the child/do any of the children usually get.....	Yes	No	Not Apply
(i) school milk?	1	2	3
(ii) school meals?	1	2	3

YES TO SCHOOL MILK AND/OR SCHOOL MEALS ASK (a) - (d)

Which child/children get school milk/school meals?

Is the school milk/school meal paid for or free?

AID FOR
What is the cost per day (or per week or per term)?

K FOR MILK ONLY
Check the amount of milk:
And what is the size of the bottles/cartons?
(PROMPT: Standard 1/3 pint?)

	School Milk				School Meals			
Person Numbers	.....	.....	.....	.....	.....	.....	.....	.....
Paid for Free	Y O	Y O	Y O	Y O	Y O	Y O	Y O	Y O
	£ p	£ p	£ p	£ p	£ p	£ p	£ p	£ p
Cost	|	|	|	|	|	|	|	|
Per day	1	1	1	1	1	1	1	1
Per week	2	2	2	2	2	2	2	2
Per term	3	3	3	3	3	3	3	3
1/3 pint	1	1	1	1				
Other	.....	.....	.....	.....				

SK ALL [NOT JUST PENSIONERS]

Does anyone in the household have meals on wheels?

Yes .... 1 → Ask (a) to (d)

No 2

F YES
a) Which people?

b) On which days of the week?

GIVE DETAILS OF DELIVERY DAYS IF NECESSARY

.....

c) Is the meals on wheels paid for or free?

F PAID FOR (Y)
d) How much is paid per meal?

Person Numbers	.....	.....	.....	.....
Mon	1	1	1	1
Tues	2	2	2	2
Wed	3	3	3	3
Thurs	4	4	4	4
Fri	5	5	5	5
Sat	6	6	6	6
Sun	7	7	7	7
Paid for Free	Y O	Y O	Y O	Y O
	£ p	£ p	£ p	£ p
Cost	|	|	|	|

ORTHERN IRELAND ONLY. ASK OF MDK AND HOH

hat is your religious denomination? [RING]

	Q	R
	Main Diary Keeper	Head of Household
Catholic	1	1
Presbyterian	2	2
Church of Ireland	3	3
Methodist	4	4
Baptist	5	5
Free Presbyterian	6	6
Brethren	7	7
Protestant - not specified	8	8
Other protestant	9	9
Other Christian	10	10
Jew	11	11
Other Non-Christian	12	12
No religion	13	13
Unwilling to answer/ DK/ Not asked	14	14

PLAIN DIARY

ALL - ASK AT FINAL VISIT

ORS / HOUSEHOLD MEMBERS GONE AWAY

Can I just check please:

(i) Did you have any visitors staying 4 nights or more (during the diary week)? Yes 1

No 2

IF YES, WRITE IN AGE AND SEX OF EACH .....
[ADD THESE TO THE HOUSEHOLD GRID]

(ii) Was anyone away for 4 nights or more (during the diary week)? Yes 1

No 2

IF YES,
WRITE IN AGE AND SEX OF EACH .....

MDK/ HOH/ XHOH will always remain on the Household Grid - even if away all week.

Others away for 4 nights or more (eg children on school trip, at relative's),
REMOVE FROM HOUSEHOLD GRID AND ADD TO OCCASIONAL VISITORS GRID

ISSION TO RECALL

If we want to contact you again about any future survey,
would it be all right if we called on you again?

Yes, it would be all right (UNCONDITIONAL) 1

No (UNCONDITIONAL) 2

Yes (WITH CONDITIONS/ QUALIFICATIONS 3

ALL REMAINING QUESTIONS INTERVIEWER CHECK AT HOME

OCCASIONAL VISITORS

i.e. These have eaten at least one meal in the household, but have NOT stayed for 4 nights or more.
Code from the 'Visitors' row of the Main Meals page of the completed Main Diary)

SEX (RING) M F	AGE Code age = 999 if 16 yrs or more	WORKING CODE (Not coded)	OCC (Computer codes)	CODE NET BALANCE (Start at 0)
1 2		Not coded	Computer codes	
1 2		Not coded	Computer codes	
1 2		Not coded	Computer codes	
1 2		Not coded	Computer codes	
1 2		Not coded	Computer codes	
1 2		Not coded	Computer codes	
1 2		Not coded	Computer codes	

Rules for coding Occasional Visitor's Grid

One line for ALL adult males (16 yrs or more), age is always 999; sum individual net balances.

One line for ALL adult females (16 yrs or more), age is always 999; sum individual net balances.

One line for EACH child (15 yrs or less); code actual age.
BUT if two people aged 15 yrs or less have same sex and age, combine on one line (code actual age) and sum individual net balances

Points are added as follows:

- breakfast = 3
- midday meal = 4
- evening meal = 7

Each person is allowed to score a maximum of 3 meals a day.

WORK OUT NET WEEKLY INCOMES FOR EACH PERSON AND WRITE THEM IN GREEN ON THE INCOME PAGE

* include usual members only (not visitors)
* convert all incomes to weekly then convert gross to net (use computer conversion)
* total the net weekly incomes and write the total in green near the bottom of the income page

ALSO WORK OUT THE GROSS WEEKLY INCOME OF THE HOH/ XHOH (IF IT IS NOT ALREADY GIVEN) AND WRITE THAT IN GREEN ON THE INCOME PAGE

* These numbers will be used in coding some of the questions below

Q153 Enter the number of people listed in the Household Grid at L

Q154 Enter the number of LINES used in the Occasional Visitors Grid above. [CODE 0 IF NONE]

Q155 Person number of CROSS-OVER Head of Household
[CODE 0 IF NO XHOH]

[IF HOH RECEIVES LESS THAN £160 PER WEEK GROSS, OR IS A STATE PENSIONER, THE XHOH IS PERSON RECEIVING £160 GROSS PER WEEK OR MORE.
A WIFE CAN BE A XHOH]

Q156 Enter person number of Head of Household
[COPY FROM GRID; THIS IS NOT THE CROSS-OVER HOH]

Q157 Enter person number of Main Diary Keeper
[COPY FROM GRID; USUALLY PERSON 1]

Q158 Sum up and enter TOTAL NET WEEKLY HOUSEHOLD INCOME (NEAREST £):

[IF INDIVIDUAL INCOMES ARE MISSING, USE ESTIMATE AT N]
[DON'T KNOW = 9999.]

£

Q159 Are any individual incomes missing?
[CHECK INCOME GRID, SECTION M]

No,	all known	1
Yes,	one or more missing, total hhld income estimated at N	2
Yes,	one or more missing, total hhld income NOT estimated at N	3
OFFICE USE ONLY - Missing incomes checked &	no income imputed	5
	one income imputed	6

Q160 Code type of incomes used to calculate household income (at Q158):
[WHEN CODING THIS QUESTION (Q160), DO NOT INCLUDE CHILD BENEFIT]

Each person's income known and is:

Net (N) and Actual(A)	1
Net (N) and Estimated (E) or Card (C)	2
Gross (G) and Actual (A)	3
Gross (G) and Estimated (E) or Card (C)	4
Some mixture of the above (ie of codes 1 - 4)	5

One or more individual incomes unknown:

OFFICE USE ONLY - One income imputed	6
Total household income estimated at Question N (cards G or H)	7
Don't Know (i.e more than one income not given, one income not given and impossible to impute, No Answer to Income Card G or H)	9

Q161 Code type of household

Households with one or more 'earners' (SEE (a) BELOW FOR DEFN OF 'EARNER')	1
Households without an earner	2
STATE pensioner Households (SEE (b) BELOW)	3

NOTES
(a) An earner includes someone unemployed for less than one year ie working codes 1 - 4, but not code 0.

(b) A state pensioner household is one in which 75% or more of the total household income is from the state pension or from a state benefit paid in place of the state pension.
This takes priority over other codes

Q162 **GROSS weekly income GRADE of Head of Household/cross over HOH**
[CHECK FOR X-HOH FIRST]

I. Households with one or more 'earners'

£910 or more	1
£640 - £909	2
£330 - £639	3
£160 - £329	4
Less than £160 (CHECK FOR X-HOH) (CHECK - CODE 7 OR 8 BELOW APPLY?)	5

II. Households without an earner

£160 or more	6
Less than £160	7

III. STATE pensioner Households 8

Q163 Enter GROSS weekly income for HOH (or cross-over HOH):
[NEAREST £]
[DON'T KNOW = 9999]

£ | | | |

FOLLOW THESE RULES:

GROSS + ACTUAL	CODE AMOUNT
GROSS + ESTIMATE	CODE AMOUNT
GROSS + CARD	CODE 9999 (= DONT KNOW)
NET + ACTUAL	CONVERT TO GROSS AND CODE AMOUNT
NET + ESTIMATE	CODE 9999 (= DONT KNOW)
NET + CARD	CODE 9999 (= DONT KNOW)
DON'T KNOW	CODE 9999

Q165 Income Support

Does the household receive any income from Income Support? [CHECK INCOME GRID, SECTION M]

Yes 1

No 2

Q166 Family credit

Does the household receive any income from Family Credit? [CHECK INCOME GRID, SECTION M]

Yes 1

No 2

Q167 Code job status of HOH (or cross-over HOH):

[FROM (d), (e) AND (f) OF OCCUPATION SECTION]

Employee - Manager	(SAME CODE AS (e))	1
Employee - Foreman/supervisor	(SAME CODE AS (e))	2
Employee - Other	(SAME CODE AS (e))	3
Self employed, zero employees		4
Self employed, with employees		5
Not apply (eg HOH unemployed for a year or more; retired)		6

Q168 Size of work establishment of HOH (or cross over HOH)

[COPY CODE FROM (f) ON GRID]

None (SELF EMP ONLY)	0
1 - 24	1
25 or more	2
Not Apply (unemployed 1 yr or more/ retired)	3

Q169 Code '1' if the HOH is unemployed (regardless of how long)

Unemployed	1
All others (eg employed, not apply)	2

Note: Unemployed does not include:
- Students or Full time education
- Housewives
- Retired
- Sick or on holiday

These should be coded '2'

NOTES FOR CODING HOUSEHOLD GRID

OCCUPATION CODES

Every household member/ regular visitor must be given an Occupation code (in OCC Box).
Those working or unemployed less than one year (ie with Working Code 1, 2, 3 or 4) get one of the Standard Occupation Codes.

All others (school children, housewives, pensioners.. ie those with Working Code 0) should be given one of the following non-standard codes:

SOC Code

RETIRED/PENSIONS

001 Unoccupied - main source (ie largest amount) of income State Retirement pension (OAP; including widows over 60 with widows' pensions)

002 Unoccupied - main source of income (ie largest amount) other state pensions (e.g. Widows under 60, disability pensions including blind pension).

003 Retired and unoccupied person where main source (ie largest amount) of income is not from state.

UNEMPLOYED/ STUDENTS

004 Unemployed, and receiving state benefits as main source of income
(eg Job Seekers Allowance, Income Support).

005 Unemployed, and state benefits NOT main source of income.
Students. (INCL aged 16 or more at school)

NB. **Sick Leave - code their job:** Individuals who are off work on sick leave, should be coded according to their job.

NON-EARNERS/ REGULAR VISITORS

006 Other non-earners (children 0-15 yrs, 'housewives', etc) including women in receipt of maternity allowances who are not working and not returning to work.

Regular visitors: children (i.e aged 0 - 15)

007 Regular visitors: adults (i.e aged 16 or more)

008 No information

NET BALANCE

Each person starts with a score of 100 points

Deduct points for meals out (NOT for meals missed or packed lunches)

- Meals out are shown on 'Meals Out' row of Meals page of Main Diary

Points are as follows:

- breakfast = 3 points
- midday meal = 4 points
- evening meal = 7 points

A 'meal out' is a meal which is 'not from the household food supplies'.

Meals on wheels are meals out.

EXAMPLE: A person has an evening meal in a friend's house. All other meals are at home.
Net balance = 100 - 7 = 93

EXAMPLE: A person eats lunch in the works canteen 5 days per week. All other meals are at home.
Net balance = 100 - 20 = 80

EXAMPLE: A person eats 1 meal a day at home, and eats nothing else.
Net balance = 100 (no deductions for missed meals)

CODING CHECKLIST

Questionnaire

* Occupation (everyone gets a a code). See page 15 for non-standard codes.

* Net balance (do not deduct points if a meal is missed). See page15 for coding rules.

* Household grid - check that no-one in h/h except MDK and HOH were away for more than 4 nights

* Occasional visitors grid - adults: age = 999
  - all male adults (16+) summed on one line
  - all female adults (16+) summed on one line

* Income - don't forget the child benefit @ £11.05 & £9.00 until end-March 1998
  - calculate Net Wkly Income

* Code pages 11 onwards.

Main Diary

* Right page: All members of household accounted for at each meal?

* Left page: Code bottom boxes: Meals out and children's (5-14yrs) lunches

* Section 1:
  - Code food items
  - Any weights/prices missing? (but no weights for codes 33501 & 33601)
  - Weights and prices plausible?
  - Correct units? eg litres = L (not LT); G not GRM, EGG not EGGS
  - Milk shown as delivered on Qnaire should be on main diary shopping pages
  - Yoghurts, desserts and milk products: convert to liquid milk equivalent
  - Convert nuts to net weight; convert trimmed veg to gross weight.

* Section 4:
  - Add school milk (section 2 indicates if received that day)
  - Include only eligible gifts. Delete others.
  - Add margin code 1 or 2

Eating Out Diary

* Cross out 'home' food (eg packed lunches)
* Check that meals out are consistent with main diary.
* Write food codes and outlet codes on EO Diaries
* Add meal/snack codes where several items covered by one price.

Transfer Sheet

* One transfer sheet per person (unless whole household refused = 1 sheet)
* Code response correctly - codes 1 and 2 only if agree with main diary (check esp 2) (response code should be written on EO Diary and transfer sheet)
* Use meal/snack codes as 'headers'
  - single items with one price do not need a meal/snack code
  - don't bracket several lines with one price

General plea - *please put a full serial number on diaries which the hhld will post back to the office*

C:\wptext\food\Q98_1

N0918

NATIONAL FOOD SURVEY

(HOUSEHOLD DIARY)

IN CONFIDENCE

All the particulars you give in this diary will be treated in STRICT CONFIDENCE.
Please do not put your name and address on it.

Please read the notes and look at the examples on pages 2–5 before you start completing the diary.

The interviewer will call again on:-

DAY	DATE	TIME

HOUSEHOLD COMPOSITION

	SEX	AGE
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Total Persons ☐

Day of week on which recording starts — Enter code → ☐ ..... DAY

1 = Mon 2 = Tues
3 = Wed 4 = Thurs
5 = Fri 6 = Sat
7 = Sun

	Tick box
Main sample only	
Main + EO sample	

Survey Month (01-12) ☐☐

Spring balance loaned? Yes ☐ No ☐

Write in serial no.

Quota Number ☐☐☐☐☐ Address ☐☐☐ H/hld ☐

FOOD AND DRINKS BOUGHT AND BROUGHT HOME **EXAMPLE PAGE**

(include soft drinks, alcoholic drinks, sweets, takeaways brought home and milk delivered today)

.....DAY

Off. check	TOTAL WEIGHT Oz, lbs, grms, kilos, pints, litres	DESCRIPTION OF FOOD OR DRINK *Please describe in FULL and give BRAND; Use one line for each ITEM*	TOTAL COST £	TOTAL COST P	INTERVIEWER USE ONLY PLEASE LEAVE BLANK Food Code	Qty	Unit	
1	1pt	Vita Pint (Blue Carton semi-skimmed milk)		38				1
	1600g	2 Sunblest sliced white loaves 800gms	1	04				1
	450g	Weetabix - Family Pack x 24 biscuits		87				1
	1lb	Frying Steak - Fresh	4	50				1
5	1lb	Pork chops - on bone - fresh	2	50				1
	1lb	1 pack danish bacon, streaky, pre-packed	1	54				1
	12oz	6 Doughnuts 2ozs - fresh from bakers	1	50				1
	840g	2 Tins Heinz baked beans 420gms		66				1
	200g	Ross frozen cod steaks in natural crumbs		98				1
10	1lb	Walls beef sausages -frozen		98				1
	350g	Pizza, pepperoni - Findus, frozen	1	99				1
	150g	Ski fruit yoghurt, low fat with pieces of fruit		28				1
	500g	2 packets Krona Double Blend 2 250gms		96				1
	250g	1 packet Kerrygold butter - Irish		67				1
15	5 kg	"Old" potatoes, fresh, prepacked	1	65				1
	1lb4oz	Cauliflower - fresh		50				1
	1½lb	eating apples - fresh		59				1
	1 litre	Robinson's orange squash - low calorie		84				1
	7oz	1 piece of fried cod 7oz - (fish & chip shop)	1	30				1
20	6oz	1portion of chips 6oz - (fish & chip shop)		60				1
	411g	Libby's tinned peaches in syrup		42				1
		6 Eggs - Free range		96				1
	2 lt	4 tins Kronenbourg 1664 strong lager 500ml	3	92				1

SCHOOL MILK - How many children had school milk today?
(WRITE IN NUMBER; 0 IF NONE/NOT APPLY) 1

MEALS ON WHEELS - How many people had meals on wheels today?
(WRITE IN NUMBER; 0 IF NONE) 0

HOME GROWN FOOD, GIFTS, FREE/REDUCED FROM WORK, WELFARE MILK, ETC

Off. check	Oz, lbs, grms, kilos, pints, litres	DESCRIPTION OF FOOD	SOURCE Garden, farm, clinic, employer, own business etc.	FREE OR COST £	FREE OR COST P	INTERVIEWER USE ONLY PLEASE LEAVE BLANK Food Code	Qty	Unit	Marg Code
	2lbs	Potatoes	Own garden store	Free					
	1¼ lbs	Chocolate cake	Made by Granny	Free					
	2oz	Radishes	Own garden grown	Free					

INTERVIEWER USE ONLY

MEALS OUT (EXCL. PACKED LUNCHES)

Any meals out/meals on wheels today? Yes.. 1
(See 'meals out' opposite) No... 2
IF YES ,WRITE IN NUMBER (LEAVE BLANK IF NONE):
(Use 'Meals Out ' info on opposite page)

MEALS ON WHEELS	
TOTAL MIDDAY MEALS OUT (incl. meals on wheels and school meals)	
TOTAL MEALS OUTSIDE HOME (incl. midday meals out)	

6 CHILDRENS (5-14 YRS INCL) LUNCHES

Any 5-14 yr old (incl) children in household? Yes... 1 No... 2
IF YES, WRITE IN NUMBER OF LUNCHES:
(Use info on opposite page)

SCHOOL MEALS (PROVIDED BY SCHOOL)	
PACKED LUNCHES FROM HOME	
OTHER LUNCHES BOUGHT OUTSIDE HOME	

REMINDER ABOUT RECORDING FOOD, SOFT DRINKS, ALCOHOLIC DRINK AND SWEETS BROUGHT HOME

This is a diary for you to record all food, soft drinks, alcohol, sweets and chocolates that are bought and brought home by you or by other members of your household. Please do not record anything which you buy and eat outside your home.

The left hand page (opposite)
It will help us very much if you make sure that you put down all the food you buy and bring home on the day you buy it.

Please enter each item you buy on a separate line. For each item we would like to know, if possible, the exact total weight and the exact total cost as well as a description of what you bought.

Packaged and tinned food
For packaged and tinned food or soft drinks the weight should be marked on the tin, bottle or package. Please remember also to record the brand name.

If you buy more than one tin, bottle or package of the same brand, please try to enter the total weight of all the tins/ bottles or packages together in the column headed 'total weight'.

Then enter the total cost of all the tins or bottles or packages of the item in the column headed 'total cost'.

It will also be helpful if you enter the number of tins or packages or bottles in the Description column with the weight per bottle or tin or package. Several examples of how to do this are shown on the Example Page (2 Sunblest sliced white loaves @ 800gms = 1600 gms; 2 tins of Heinz baked beans @ 420 gms = 840gms; 2 packets Krona Double Blend @ 250 gms = 500 gms.)

However, don't worry if you can't work out the total weight. The interviewer will help you when he or she comes back.

Fresh fruit and vegetables
It is not necessary to put down the numbers of items that are bought unpackaged. Just enter the total weight and the total cost and a description. This holds for meat (chops, sausages, burgers) as well as for all vegetables and fruit. It is not necessary to count the numbers, e.g. we do not need 4 apples, as long as you enter the total weight of apples is, for example $1^1/_2$lbs

Please remember to record the weight of fresh fruit and vegetables, weighing them at home if necessary.

There is one exception. Please enter the number of eggs you have bought; you do not need to weigh the eggs!

Takeaway meals
All takeaway meals and snacks, such as fish and chips, Chinese, Indian, pizza etc, should be recorded in the "shopping" page, with the number of portions of each and the total price, if they are brought home to eat. Please record whether the food was delivered to your home or bought from a restaurant, takeaway place, fish and chip shop or other catering place, or bought from a retail shop, such as a bakery or supermarket.

For pizzas brought home please state whether it was a whole pizza - with the size of possible, or pizza slices - with how many slices, and the price.

The right-hand page (opposite)

Please write in a detailed description of each meal served at home, together with the number of people eating it, and also describe how each member of your Household who did **not** eat at home obtained a meal. If they did not eat a meal at that time, this too should be noted. Thus everyone in the Household should be accounted for at each meal, as well as any visitors.

The kind of detail we want is what would be found on a normal menu. We do not need the ingredients of made-up dishes, but the ingredients of salads should be itemised. Quantities are not required. There is no need to distinguish between things eaten by everyone and things eaten by certain members only.

If a takeaway meal was served at home, please give details including the number of portions, for example "fish and chips, (takeaway) 1 portion fish; 1 portion chips". See example on opposite page.

If a member of your household has a packed meal for, say, their mid-day meal, note the sex and age of the individual in the space provided, and write briefly the content of that packed meal. See example opposite.

THANK YOU FOR YOUR TIME AND TROUBLE.

	1	2	3
	BREAKFAST	MID-DAY MEAL	MAIN AFTERNOON/ EVENING MEAL
What did you serve? If this was a Meals on Wheels or a takeaway meal please say which)	Orange juice Scrambled eggs Bacon Toast - white Butter Coffee Milk Sugar Tea Weetabix	Fish and Chips (takeaway) 1 portion fish 1 portion chips Bread - white Butter Tea Milk Sugar	Steak Runner beans Cauliflower Chips (home-made) Lager Coffee Milk Sugar Orange squash
NUMBER OF PEOPLE How many people in the front of this vary ate this meal?	Number 3	Number 1	Number 4
VISITORS Did you have any visitors for this meal? FEMALE = F MALE = M	VISITORS TO BREAKFAST SEX / AGE	VISITORS TO MID-DAY MEAL SEX / AGE F / 48	VISITORS TO AFTERNOON/EVENING MEAL SEX / AGE
PACKED MEALS Did anyone take a packed meal or snack from home to eat out? FEMALE = F MALE = M	PACKED BREAKFAST SEX / AGE	PACKED MID-DAY MEAL SEX / AGE M / 40	PACKED AFTERNOON/EVENING MEAL SEX / AGE
If so, what were the contents of the packed meal/ snack?		Sandwich: brown bread, beef and butter, radishes, Kit-Kat, apple	
MEALS OUT Did anyone obtain a meal out (for which you did not provide the food) Where was it eaten? FEMALE = F MALE = M	BREAKFAST OUT SEX / AGE / WHERE?	MID-DAY MEAL OUT SEX / AGE / WHERE? F / 6 / School M / 11 / School	AFTERNOON/EVENING MEAL OUT SEX / AGE / WHERE?
DID NOT EAT A MEAL Who did not have a meal at this time, whether at home or out? FEMALE = F MALE = M	DID NOT EAT A MEAL SEX / AGE F / 6	DID NOT EAT A MEAL SEX / AGE	DID NOT EAT A MEAL SEX / AGE

FOOD AND DRINKS BOUGHT AND BROUGHT HOME

(include soft drinks, alcoholic drinks, sweets, takeaways brought home and milk delivered today)

.....DAY - 1

Off. check	TOTAL WEIGHT Oz, lbs, grms, kilos, pints, litres	DESCRIPTION OF FOOD OR DRINK *Please describe in FULL and give BRAND; Use one line for each ITEM*	TOTAL COST £	TOTAL COST p	INTERVIEWER USE ONLY PLEASE LEAVE BLANK Food Code	Qty	Unit	
1								1
								1
								1
								1
								1
5								1
								1
								1
								1
								1
								1
10								1
								1
								1
								1
								1
								1
15								1
								1
								1
								1
								1
								1
20								1
								1
								1
								1

. SCHOOL MILK - How many children had school milk today?
(WRITE IN NUMBER; 0 IF NONE/NOT APPLY) .....

. MEALS ON WHEELS - How many people had meals on wheels today?
(WRITE IN NUMBER; 0 IF NONE) .....

. HOME GROWN FOOD, GIFTS, FREE/REDUCED FROM WORK, WELFARE MILK, ETC

Off. check	Oz, lbs, grms, kilos, pints, litres	DESCRIPTION OF FOOD	SOURCE Garden, farm, clinic, employer, own business etc.	FREE OR COST £	FREE OR COST p	INTERVIEWER USE ONLY PLEASE LEAVE BLANK Food Code	Qty	Unit	Marg Code

INTERVIEWER USE ONLY

MEALS OUT (EXCL. PACKED LUNCHES)

Any meals out/meals on wheels today? Yes.. 1
(See 'meals out' opposite) No... 2
IF YES ,WRITE IN NUMBER (LEAVE BLANK IF NONE):
(Use 'Meals Out ' info on opposite page)

MEALS ON WHEELS	
TOTAL MIDDAY MEALS OUT (incl. meals on wheels and school meals)	
TOTAL MEALS OUTSIDE HOME (incl. midday meals out)	

6 CHILDRENS (5-14 YRS INCL) LUNCHES

Any 5-14 yr old (incl) children in household? Yes... 1 No... 2
IF YES, WRITE IN NUMBER OF LUNCHES:
(Use info on opposite page)

SCHOOL MEALS (PROVIDED BY SCHOOL)	
PACKED LUNCHES FROM HOME	
OTHER LUNCHES BOUGHT OUTSIDE HOME	

MAIN MEALS

	1	2	3
	BREAKFAST	MID-DAY MEAL	MAIN AFTERNOON/ EVENING MEAL
What did you serve? If this was a Meals on Wheels or a takeaway meal please say which)			
NUMBER OF PEOPLE How many people in the front of this diary ate this meal?	Number	Number	Number .....
VISITORS Did you have any visitors for this meal? FEMALE = F MALE = M	VISITORS TO BREAKFAST SEX / AGE	VISITORS TO MID-DAY MEAL SEX / AGE	VISITORS TO AFTERNOON/EVENING MEAL SEX / AGE
PACKED MEALS Did anyone take a packed meal or snack from home to eat out? FEMALE = F MALE = M	PACKED BREAKFAST SEX / AGE	PACKED MID-DAY MEAL SEX / AGE	PACKED AFTERNOON/EVENING MEAL SEX / AGE
If so, what were the contents of the packed meal/ snack?			
MEALS OUT Did anyone obtain a meal out (for which you did not provide the food) Where was it eaten? FEMALE = F MALE = M	BREAKFAST OUT SEX / AGE / WHERE?	MID-DAY MEAL OUT SEX / AGE / WHERE?	AFTERNOON/EVENING MEAL OUT SEX / AGE / WHERE?
DID NOT EAT A MEAL Who did not have a meal at this time, whether at home or out? FEMALE = F MALE = M	DID NOT EAT A MEAL SEX / AGE	DID NOT EAT A MEAL SEX / AGE	DID NOT EAT A MEAL SEX / AGE

1. FOOD AND DRINKS BOUGHT AND BROUGHT HOME

(include soft drinks, alcoholic drinks, sweets, takeaways brought home and milk delivered today)

.....DAY - 2

Off. check	TOTAL WEIGHT Oz, lbs, grms, kilos,pints,litres	DESCRIPTION OF FOOD OR DRINK *Please describe in FULL and give BRAND; Use one line for each ITEM*	TOTAL COST £	p	INTERVIEWER USE ONLY PLEASE LEAVE BLANK Food Code	Qty	Unit	
1								1
								1
								1
								1
								1
5								1
								1
								1
								1
								1
								1
10								1
								1
								1
								1
								1
								1
15								1
								1
								1
								1
								1
								1
20								1
								1
								1
								1

2. SCHOOL MILK - How many children had school milk today?

(WRITE IN NUMBER; 0 IF NONE/NOT APPLY) .....

3. MEALS ON WHEELS - How many people had meals on wheels today?

(WRITE IN NUMBER; 0 IF NONE) .....

4. HOME GROWN FOOD, GIFTS, FREE/REDUCED FROM WORK, WELFARE MILK, ETC

Off. check	Oz, lbs, grms, kilos,pints,litres	DESCRIPTION OF FOOD	SOURCE Garden, farm, clinic, employer, own business etc.	FREE OR COST £	p	INTERVIEWER USE ONLY PLEASE LEAVE BLANK Food Code	Qty	Unit	Marg Code

INTERVIEWER USE ONLY

5 MEALS OUT (EXCL. PACKED LUNCHES)

Any meals out/meals on wheels today? Yes.. 1
(See 'meals out' opposite) No... 2
IF YES ,WRITE IN NUMBER (LEAVE BLANK IF NONE):
(Use 'Meals Out ' info on opposite page)

MEALS ON WHEELS	
TOTAL MIDDAY MEALS OUT (incl. meals on wheels and school meals)	
TOTAL MEALS OUTSIDE HOME (incl. midday meals out)	

6 CHILDRENS (5-14 YRS INCL) LUNCHES

Any 5-14 yr old (incl) children in household? Yes... 1 No... 2
IF YES, WRITE IN NUMBER OF LUNCHES:
(Use info on opposite page)

SCHOOL MEALS (PROVIDED BY SCHOOL)	
PACKED LUNCHES FROM HOME	
OTHER LUNCHES BOUGHT OUTSIDE HOME	

MAIN MEALS

	1	2	3
	BREAKFAST	MID-DAY MEAL	MAIN AFTERNOON/ EVENING MEAL
What did you serve? (If this was a Meals on Wheels or a takeaway meal please say which)			
NUMBER OF PEOPLE How many people on the front of this diary ate this meal?	Number	Number	Number .....
VISITORS Did you have any visitors for this meal? FEMALE = F MALE = M	VISITORS TO BREAKFAST SEX | AGE	VISITORS TO MID-DAY MEAL SEX | AGE	VISITORS TO AFTERNOON/EVENING MEAL SEX | AGE
PACKED MEALS Did anyone take a packed meal or snack from home to eat out? FEMALE = F MALE = M	PACKED BREAKFAST SEX | AGE	PACKED MID-DAY MEAL SEX | AGE	PACKED AFTERNOON/EVENING MEAL SEX | AGE
If so, what were the contents of the packed meal/ snack?			
MEALS OUT Did anyone obtain a meal out (for which you did not provide the food) Where was it eaten? FEMALE = F MALE = M	BREAKFAST OUT SEX | AGE | WHERE?	MID-DAY MEAL OUT SEX | AGE | WHERE?	AFTERNOON/EVENING MEAL OUT SEX | AGE | WHERE?
DID NOT EAT A MEAL Who did not have a meal at this time, whether at home or out? FEMALE = F MALE = M	DID NOT EAT A MEAL SEX | AGE	DID NOT EAT A MEAL SEX | AGE	DID NOT EAT A MEAL SEX | AGE

1. FOOD AND DRINKS BOUGHT AND BROUGHT HOME

(include soft drinks, alcoholic drinks, sweets, takeaways brought home and milk delivered today)

.....DAY - 3

Off. check	TOTAL WEIGHT Oz, lbs, grms, kilos,pints,litres	DESCRIPTION OF FOOD OR DRINK *Please describe in FULL and give BRAND; Use one line for each ITEM*	TOTAL COST £	p	INTERVIEWER USE ONLY PLEASE LEAVE BLANK Food Code	Qty	Unit	
1								1
								1
								1
								1
5								1
								1
								1
								1
								1
10								1
								1
								1
								1
								1
15								1
								1
								1
								1
								1
20								1
								1
								1
								1

2. SCHOOL MILK - How many children had school milk today?

(WRITE IN NUMBER; 0 IF NONE/NOT APPLY) .....

3. MEALS ON WHEELS - How many people had meals on wheels today?

(WRITE IN NUMBER; 0 IF NONE) .....

4. HOME GROWN FOOD, GIFTS, FREE/REDUCED FROM WORK, WELFARE MILK, ETC

Off. check	Oz, lbs, grms, kilos,pints,litres	DESCRIPTION OF FOOD	SOURCE Garden, farm, clinic, employer, own business etc.	FREE OR COST £	p	INTERVIEWER USE ONLY PLEASE LEAVE BLANK Food Code	Qty	Unit	Marg Code

INTERVIEWER USE ONLY

5 MEALS OUT (EXCL. PACKED LUNCHES)

Any meals out/meals on wheels today? Yes.. 1
(See 'meals out' opposite) No... 2

IF YES ,WRITE IN NUMBER (LEAVE BLANK IF NONE):
(Use 'Meals Out ' info on opposite page)

MEALS ON WHEELS	
TOTAL MIDDAY MEALS OUT (incl. meals on wheels and school meals)	
TOTAL MEALS OUTSIDE HOME (incl. midday meals out)	

6 CHILDRENS (5-14 YRS INCL) LUNCHES

Any 5-14 yr old (incl) children in household? Yes... 1 No... 2

IF YES, WRITE IN NUMBER OF LUNCHES:
(Use info on opposite page)

SCHOOL MEALS (PROVIDED BY SCHOOL)	
PACKED LUNCHES FROM HOME	
OTHER LUNCHES BOUGHT OUTSIDE HOME	

MAIN MEALS

	1	2	3
	BREAKFAST	MID-DAY MEAL	MAIN AFTERNOON/ EVENING MEAL
What did you serve? If this was a Meals on Wheels or a takeaway meal please say which)			
NUMBER OF PEOPLE How many people in the front of this diary ate this meal?	Number	Number	Number .....
VISITORS Did you have any visitors for this meal? FEMALE = F MALE = M	VISITORS TO BREAKFAST SEX | AGE	VISITORS TO MID-DAY MEAL SEX | AGE	VISITORS TO AFTERNOON/EVENING MEAL SEX | AGE
PACKED MEALS Did anyone take a packed meal or snack from home to eat out? FEMALE = F MALE = M	PACKED BREAKFAST SEX | AGE	PACKED MID-DAY MEAL SEX | AGE	PACKED AFTERNOON/EVENING MEAL SEX | AGE
If so, what were the contents of the packed meal/ snack?			
MEALS OUT Did anyone obtain a meal out (for which you did not provide the food) Where was it eaten? FEMALE = F MALE = M	BREAKFAST OUT SEX | AGE | WHERE?	MID-DAY MEAL OUT SEX | AGE | WHERE?	AFTERNOON/EVENING MEAL OUT SEX | AGE | WHERE?
DID NOT EAT A MEAL Who did not have a meal at this time, whether at home or out? FEMALE = F MALE = M	DID NOT EAT A MEAL SEX | AGE	DID NOT EAT A MEAL SEX | AGE	DID NOT EAT A MEAL SEX | AGE

1. FOOD AND DRINKS BOUGHT AND BROUGHT HOME

(include soft drinks, alcoholic drinks, sweets, takeaways brought home and milk delivered today)

.....DAY - 4

Off. check	TOTAL WEIGHT Oz, lbs, grms, kilos,pints,litres	DESCRIPTION OF FOOD OR DRINK *Please describe in FULL and give BRAND; Use one line for each ITEM*	TOTAL COST £	TOTAL COST p	INTERVIEWER USE ONLY PLEASE LEAVE BLANK Food Code	Qty	Unit	
1								1
								1
								1
								1
5								1
								1
								1
								1
								1
10								1
								1
								1
								1
								1
15								1
								1
								1
								1
								1
20								1
								1
								1

2. SCHOOL MILK

- How many children had school milk today?
(WRITE IN NUMBER; 0 IF NONE/NOT APPLY) .....

3. MEALS ON WHEELS

- How many people had meals on wheels today?
(WRITE IN NUMBER; 0 IF NONE) .....

4. HOME GROWN FOOD, GIFTS, FREE/REDUCED FROM WORK, WELFARE MILK, ETC

Off. check	Oz, lbs, grms, kilos,pints,litres	DESCRIPTION OF FOOD	SOURCE Garden, farm, clinic, employer, own business etc.	FREE OR COST £	FREE OR COST p	INTERVIEWER USE ONLY PLEASE LEAVE BLANK Food Code	Qty	Unit	Marg Code

INTERVIEWER USE ONLY

5 MEALS OUT (EXCL. PACKED LUNCHES)

Any meals out/meals on wheels today? Yes.. 1
(See 'meals out' opposite) No... 2
IF YES ,WRITE IN NUMBER (LEAVE BLANK IF NONE):
(Use 'Meals Out ' info on opposite page)

MEALS ON WHEELS	
TOTAL MIDDAY MEALS OUT (incl. meals on wheels and school meals)	
TOTAL MEALS OUTSIDE HOME (incl. midday meals out)	

6 CHILDRENS (5-14 YRS INCL) LUNCHES

Any 5-14 yr old (incl) children in household? Yes... 1 No... 2
IF YES, WRITE IN NUMBER OF LUNCHES:
(Use info on opposite page)

SCHOOL MEALS (PROVIDED BY SCHOOL)	
PACKED LUNCHES FROM HOME	
OTHER LUNCHES BOUGHT OUTSIDE HOME	

MAIN MEALS

	1	2	3
	BREAKFAST	MID-DAY MEAL	MAIN AFTERNOON/ EVENING MEAL
What did you serve? (If this was a Meals on Wheels or a takeaway meal please say which)			
NUMBER OF PEOPLE How many people on the front of this diary ate this meal?	Number	Number	Number .....
VISITORS Did you have any visitors for this meal? FEMALE = F MALE = M	VISITORS TO BREAKFAST SEX / AGE	VISITORS TO MID-DAY MEAL SEX / AGE	VISITORS TO AFTERNOON/EVENING MEAL SEX / AGE
PACKED MEALS Did anyone take a packed meal or snack from home to eat out? FEMALE = F MALE = M	PACKED BREAKFAST SEX / AGE	PACKED MID-DAY MEAL SEX / AGE	PACKED AFTERNOON/EVENING MEAL SEX / AGE
If so, what were the contents of the packed meal/ snack?			
MEALS OUT Did anyone obtain a meal out (for which you did not provide the food) Where was it eaten? FEMALE = F MALE = M	BREAKFAST OUT SEX / AGE / WHERE?	MID-DAY MEAL OUT SEX / AGE / WHERE?	AFTERNOON/EVENING MEAL OUT SEX / AGE / WHERE?
DID NOT EAT A MEAL Who did not have a meal at this time, whether at home or out? FEMALE = F MALE = M	DID NOT EAT A MEAL SEX / AGE	DID NOT EAT A MEAL SEX / AGE	DID NOT EAT A MEAL SEX / AGE

1. FOOD AND DRINKS BOUGHT AND BROUGHT HOME

(include soft drinks, alcoholic drinks, sweets, takeaways brought home and milk delivered today)

.....DAY **-5**

Off. check	TOTAL WEIGHT Oz, lbs, grms, kilos,pints,litres	DESCRIPTION OF FOOD OR DRINK *Please describe in FULL and give BRAND; Use one line for each ITEM*	TOTAL COST £	p	INTERVIEWER USE ONLY PLEASE LEAVE BLANK Food Code	Qty	Unit	
1								1
								1
								1
								1
5								1
								1
								1
								1
								1
								1
10								1
								1
								1
								1
								1
15								1
								1
								1
								1
								1
								1
20								1
								1
								1
								1

2. SCHOOL MILK

- How many children had school milk today?
(WRITE IN NUMBER; 0 IF NONE/NOT APPLY) .....

3. MEALS ON WHEELS

- How many people had meals on wheels today?
(WRITE IN NUMBER; 0 IF NONE) .....

4. HOME GROWN FOOD, GIFTS, FREE/REDUCED FROM WORK, WELFARE MILK, ETC

Off. check	Oz, lbs, grms, kilos,pints,litres	DESCRIPTION OF FOOD	SOURCE Garden, farm, clinic, employer, own business etc.	FREE OR COST £	p	INTERVIEWER USE ONLY PLEASE LEAVE BLANK Food Code	Qty	Unit	Marg Code

INTERVIEWER USE ONLY

5 MEALS OUT (EXCL. PACKED LUNCHES)

Any meals out/meals on wheels today? Yes.. 1
(See 'meals out' opposite) No... 2

IF YES ,WRITE IN NUMBER (LEAVE BLANK IF NONE):
(Use 'Meals Out ' info on opposite page)

MEALS ON WHEELS	
TOTAL MIDDAY MEALS OUT (incl. meals on wheels and school meals)	
TOTAL MEALS OUTSIDE HOME (incl. midday meals out)	

6 CHILDRENS (5-14 YRS INCL) LUNCHES

Any 5-14 yr old (incl) children in household? Yes... 1 No... 2

IF YES, WRITE IN NUMBER OF LUNCHES:
(Use info on opposite page)

SCHOOL MEALS (PROVIDED BY SCHOOL)	
PACKED LUNCHES FROM HOME	
OTHER LUNCHES BOUGHT OUTSIDE HOME	

MAIN MEALS

	1	2	3
	BREAKFAST	MID-DAY MEAL	MAIN AFTERNOON/ EVENING MEAL
What did you serve? (If this was a Meals on Wheels or a takeaway meal please say which)			
NUMBER OF PEOPLE How many people on the front of this diary ate this meal?	Number	Number	Number .....
VISITORS Did you have any visitors for this meal? FEMALE = F MALE = M	VISITORS TO BREAKFAST SEX / AGE	VISITORS TO MID-DAY MEAL SEX / AGE	VISITORS TO AFTERNOON/EVENING MEAL SEX / AGE
PACKED MEALS Did anyone take a packed meal or snack from home to eat out? FEMALE = F MALE = M	PACKED BREAKFAST SEX / AGE	PACKED MID-DAY MEAL SEX / AGE	PACKED AFTERNOON/EVENING MEAL SEX / AGE
If so, what were the contents of the packed meal/ snack?			
MEALS OUT Did anyone obtain a meal out (for which you did not provide the food) Where was it eaten? FEMALE = F MALE = M	BREAKFAST OUT SEX / AGE / WHERE?	MID-DAY MEAL OUT SEX / AGE / WHERE?	AFTERNOON/EVENING MEAL OUT SEX / AGE / WHERE?
DID NOT EAT A MEAL Who did not have a meal at this time, whether at home or out? FEMALE = F MALE = M	DID NOT EAT A MEAL SEX / AGE	DID NOT EAT A MEAL SEX / AGE	DID NOT EAT A MEAL SEX / AGE

FOOD AND DRINKS BOUGHT AND BROUGHT HOME
(include soft drinks, alcoholic drinks, sweets, takeaways brought home and milk delivered today)

.....DAY **- 6**

Off. check	TOTAL WEIGHT Oz, lbs, grms, kilos, pints, litres	DESCRIPTION OF FOOD OR DRINK *Please describe in FULL and give BRAND; Use one line for each ITEM*	TOTAL COST £	p	INTERVIEWER USE ONLY PLEASE LEAVE BLANK Food Code	Qty	Unit	
1								1
								1
								1
								1
5								1
								1
								1
								1
								1
10								1
								1
								1
								1
								1
15								1
								1
								1
								1
								1
20								1
								1
								1

SCHOOL MILK - How many children had school milk today?
(WRITE IN NUMBER; 0 IF NONE/NOT APPLY) .....

MEALS ON WHEELS - How many people had meals on wheels today?
(WRITE IN NUMBER; 0 IF NONE) .....

HOME GROWN FOOD, GIFTS, FREE/REDUCED FROM WORK, WELFARE MILK, ETC

Off. check	Oz, lbs, grms, kilos, pints, litres	DESCRIPTION OF FOOD	SOURCE Garden, farm, clinic, employer, own business etc.	FREE OR COST £	p	INTERVIEWER USE ONLY PLEASE LEAVE BLANK Food Code	Qty	Unit	Marg Code

INTERVIEWER USE ONLY

MEALS OUT (EXCL. PACKED LUNCHES)

Any meals out/meals on wheels today? Yes.. 1
(See 'meals out' opposite) No... 2
IF YES ,WRITE IN NUMBER (LEAVE BLANK IF NONE):
(Use 'Meals Out ' info on opposite page)

MEALS ON WHEELS	
TOTAL MIDDAY MEALS OUT (incl. meals on wheels and school meals)	
TOTAL MEALS OUTSIDE HOME (incl. midday meals out)	

6 CHILDRENS (5-14 YRS INCL) LUNCHES

Any 5-14 yr old (incl) children in household? Yes... 1 No... 2
IF YES, WRITE IN NUMBER OF LUNCHES:
(Use info on opposite page)

SCHOOL MEALS (PROVIDED BY SCHOOL)	
PACKED LUNCHES FROM HOME	
OTHER LUNCHES BOUGHT OUTSIDE HOME	

MAIN MEALS

	1	2	3
	BREAKFAST	MID-DAY MEAL	MAIN AFTERNOON/ EVENING MEAL
What did you serve? If this was a Meals on Wheels or a takeaway meal please say which)			
NUMBER OF PEOPLE How many people in the front of this ary ate this meal?	Number	Number	Number .....
VISITORS Did you have any visitors for this meal? FEMALE = F MALE = M	VISITORS TO BREAKFAST SEX / AGE	VISITORS TO MID-DAY MEAL SEX / AGE	VISITORS TO AFTERNOON/EVENING MEAL SEX / AGE
PACKED MEALS Did anyone take a packed meal or pack from home to eat out? FEMALE = F MALE = M	PACKED BREAKFAST SEX / AGE	PACKED MID-DAY MEAL SEX / AGE	PACKED AFTERNOON/EVENING MEAL SEX / AGE
If so, what were the contents of the packed meal/ snack?			
MEALS OUT Did anyone obtain a meal out (for which you did not provide the food) Where was it eaten? FEMALE = F MALE = M	BREAKFAST OUT SEX / AGE / WHERE?	MID-DAY MEAL OUT SEX / AGE / WHERE?	AFTERNOON/EVENING MEAL OUT SEX / AGE / WHERE?
DID NOT EAT A MEAL Who did not have a meal at this time, whether at home or out? FEMALE = F MALE = M	DID NOT EAT A MEAL SEX / AGE	DID NOT EAT A MEAL SEX / AGE	DID NOT EAT A MEAL SEX / AGE

1. FOOD AND DRINKS BOUGHT AND BROUGHT HOME

(include soft drinks, alcoholic drinks, sweets, takeaways brought home and milk delivered today)

.....DAY **-7**

Off. check	TOTAL WEIGHT Oz, lbs, grms, kilos,pints,litres	DESCRIPTION OF FOOD OR DRINK *Please describe in FULL and give BRAND; Use one line for each ITEM*	TOTAL COST £	p	INTERVIEWER USE ONLY PLEASE LEAVE BLANK Food Code	Qty	Unit	
1								1
								1
								1
								1
5								1
								1
								1
								1
								1
10								1
								1
								1
								1
								1
15								1
								1
								1
								1
								1
20								1
								1
								1
								1

2. SCHOOL MILK

- How many children had school milk today?
(WRITE IN NUMBER; 0 IF NONE/NOT APPLY) .....

3. MEALS ON WHEELS

- How many people had meals on wheels today?
(WRITE IN NUMBER; 0 IF NONE) .....

4. HOME GROWN FOOD, GIFTS, FREE/REDUCED FROM WORK, WELFARE MILK, ETC

Off. check	Oz, lbs, grms, kilos,pints,litres	DESCRIPTION OF FOOD	SOURCE Garden, farm, clinic, employer, own business etc.	FREE OR COST £	p	INTERVIEWER USE ONLY PLEASE LEAVE BLANK Food Code	Qty	Unit	Marg Code

INTERVIEWER USE ONLY

5 MEALS OUT (EXCL. PACKED LUNCHES)

Any meals out/meals on wheels today? Yes.. 1
(See 'meals out' opposite) No... 2
IF YES ,WRITE IN NUMBER (LEAVE BLANK IF NONE):
(Use 'Meals Out ' info on opposite page)

MEALS ON WHEELS	
TOTAL MIDDAY MEALS OUT (incl. meals on wheels and school meals)	
TOTAL MEALS OUTSIDE HOME (incl. midday meals out)	

6 CHILDRENS (5-14 YRS INCL) LUNCHES

Any 5-14 yr old (incl) children in household? Yes.. 1 No... 2
IF YES, WRITE IN NUMBER OF LUNCHES:
(Use info on opposite page)

SCHOOL MEALS (PROVIDED BY SCHOOL)	
PACKED LUNCHES FROM HOME	
OTHER LUNCHES BOUGHT OUTSIDE HOME	

MAIN MEALS

	1	2	3
	BREAKFAST	MID-DAY MEAL	MAIN AFTERNOON/ EVENING MEAL
What did you serve? If this was a Meals on Wheels or a takeaway meal please say which)			
NUMBER OF PEOPLE How many people in the front of this Party ate this meal?	Number	Number	Number .....
VISITORS Did you have any visitors for this meal? FEMALE = F MALE = M	VISITORS TO BREAKFAST SEX | AGE	VISITORS TO MID-DAY MEAL SEX | AGE	VISITORS TO AFTERNOON/EVENING MEAL SEX | AGE
PACKED MEALS Did anyone take a packed meal or snack from home to eat out? FEMALE = F MALE = M	PACKED BREAKFAST SEX | AGE	PACKED MID-DAY MEAL SEX | AGE	PACKED AFTERNOON/EVENING MEAL SEX | AGE
If so, what were the contents of the packed meal/ snack?			
MEALS OUT Did anyone obtain a meal out (for which you did not provide the food) Where was it eaten? FEMALE = F MALE = M	BREAKFAST OUT SEX | AGE | WHERE?	MID-DAY MEAL OUT SEX | AGE | WHERE?	AFTERNOON/EVENING MEAL OUT SEX | AGE | WHERE?
DID NOT EAT A MEAL Who did not have a meal at this time, whether at home or out? FEMALE = F MALE = M	DID NOT EAT A MEAL SEX | AGE	DID NOT EAT A MEAL SEX | AGE	DID NOT EAT A MEAL SEX | AGE

WERE THERE ANY SPECIAL CIRCUMSTANCES ABOUT THIS WEEK'S SHOPPING?.

NOTES

Office for National Statistics,
1 Drummond Gate,
London SW1V 2QQ.

Central Survey Unit,
Londonderry House,
21-27 Chichester St,
Belfast BT1 4SX

Ministry of Agriculture, Fisheries and Food,
Whitehall Place, (West Block),
London SW1A 2HH.

Department of Agriculture for Northern Ireland,
Dundonald House,
Upper Newtownards,
Belfast BT4 3SB

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